Freezer Service Manual

i.Series® and Horizon Series™

Model Group	i.Series	Horizon Series
Plasma Storage	iPF120, iPF125 (Version D)	HPF120, HPF125 (Version D)
Laboratory	iLF120, iLF125 (Version D)	HLF120, HLF125 (Version D)

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Document History

Revision	Date	CO	Supersession	Revision Description
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B	22 APR 2013	8300	B supersedes A	Revised electrical schematics for Horizon Series freezer.
C	04 DEC 2013*	8953	C supersedes B	► Removed all references to mechanical Access Control. ► Added references to magnetic Access Control. ► Corrected low-temperature alarm setting for Horizon Series. ► Removed reference to condenser temperature alarm in Horizon Series troubleshooting section. ► Added notes to propylene glycol specification to allow for equivalent low-temperature fluid. ► Corrected shipping location of monitoring system backup battery for Horizon Series.
D	28 MAY 2014*	9497	D supersedes C	► Changed part number for TXV valve (Items 10.4.1 and 16.4.1). ► Revised remote alarm contact capacity.
E	23 MAR 2015*	10320	E supersedes D	► Updated instruction in **Section III**, **Items 13.1** through **13.6.3** to reflect use of monitor and control interface with new Min/Max temperature recording feature. ► Added Document Updates, to Document History page. ► Added Confidential / Proprietary Notice, **Section I**, **Item 1.4** and Disclaimer, **Section I**, **Item 1.5**.

* Date submitted for Change Order review. Actual release date may vary.

Document Updates

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Section I: General Information

1 About this Manual

1.1 Intended Audience

This manual is intended for use by end users of the freezer and authorized service technicians.

1.2 Model References

Generic references are used throughout this manual to group models that contain similar features. For example, “125 models” refers to all models of that size (iPF125, HPF125, iLF125, HLF125). This manual covers all upright freezers, which may be identified singly, by their size, or by their respective “Series.”

1.3 Copyright and Trademark

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1.4 Confidential / Proprietary Notices

Use of any portion(s) of this document to copy, translate, disassemble or decompile, or create or attempt to create by reverse engineering or otherwise the information from Helmer Scientific products is expressly prohibited.

1.5 Disclaimer

This manual is intended as a guide to provide the operator with necessary instructions on the proper use and maintenance of certain Helmer Scientific products.

Any failure to follow the instructions as described could result in impaired product function, injury to the operator or others, or void applicable product warranties. Helmer Scientific accepts no responsibility for liability resulting from improper use or maintenance of its products.

The screenshots and component images appearing in this guide are provided for illustrative purposes only, and may vary slightly from the actual software screens and/or product components.

2 Safety

Includes general safety information for freezer operation.

2.1 Labels

Caution: Risk of damage to equipment or danger to operator

Caution: Unlock all casters

Caution: Hot surface

Earth / ground terminal

Caution: Shock/electrical hazard

Protective earth / ground terminal

2.2 Avoiding Injury

- ► Review safety instructions before installing, using, or maintaining the equipment.
- ► Do not open multiple, loaded drawers at the same time.
- ► Do not move a unit whose load exceeds 900 lbs (408 kg).
- ► Before moving unit, ensure casters are unlocked and free of debris.
- ► Never physically restrict any moving component.
- ► Avoid removing electrical service panels and access panels unless so instructed.
- ► Use manufacturer supplied power cords only.

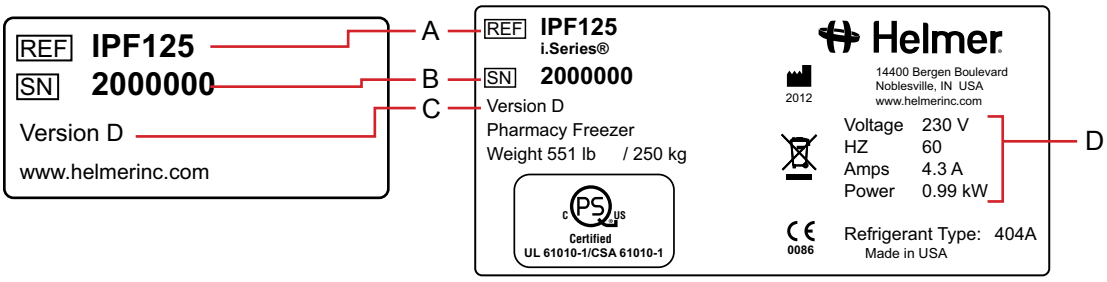
CAUTION Decontaminate parts prior to sending for service or repair. Contact Helmer or your distributor for decontamination instructions and a Return Authorization Number.

3 Configuration

3.1 Model and Input Power

NOTE Service information varies depending on the model and power requirements.

This information appears on the product specification label, located on the rear of the freezer below the electrical box. The model also appears on a label located in the chamber on the upper side of the right wall.



Left: Chamber label. Right: Product Specification label.

Label	Description
A	Model (REF)
B	Serial number
C	Version
D	Power requirements

3.2 Control System

NOTE Service information varies depending on the control system.

Helmer freezers have one of two control systems installed. The type of control system varies by model.

3.2.1 i.C³® Control System

i.Series freezers are equipped with the i.C³ monitoring and control system. The i.C³ system combines temperature control and monitoring into a single interface.

3.2.2 Horizon Series Control System

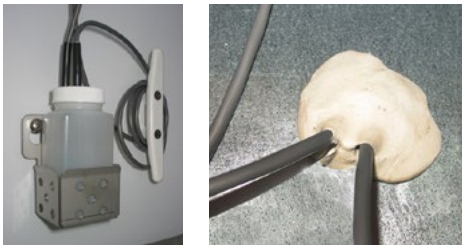
Horizon Series freezers feature the Horizon combined monitor and temperature controller. The Horizon Series system controls chamber temperature and monitors and displays operational information.

3.3 Temperature Probes

Number and location of probes varies by model. External probes may be introduced through existing top ports and immersed in existing probe bottles.

For each probe bottle, use:

► 4 oz. (120 mL) of product simulation solution (1:1 ratio of water to propylene glycol or equivalent low-temperature fluid).



Left: Probe bottle with temperature and chart recorder probes. Right: Top access port.

3.3.1 Fill Temperature Probe Bottle

NOTE Temperature probes are fragile; handle with care.

1. Remove all probes from bottle and remove bottle from bracket.
2. Remove cap and fill with 4 oz. (120 mL) of product simulation solution.
3. Install cap and place bottle in bracket.
4. Replace probes, immersing at least 2” (50 mm) in solution.

3.3.2 Install Additional Probe Through Top Port

1. Peel back putty to expose port.
2. Insert probe through port into chamber.
3. Insert probe into bottle.
4. Replace putty, ensuring a tight seal.

3.4 Chart Recorder

If installed, refer to the Temperature Chart Recorder Operation and Service Manual on CD.

The chart recorder has a battery system, enabling a period of continuous operation if power is lost. Battery life varies by manufacturer as well as voltage level remaining. Providing full power is available, backup power for the temperature chart recorder is available for up to 14 hours.

Prior to use:

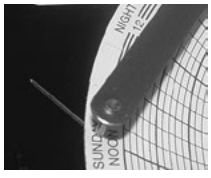
- ► Install battery.
- ► Add paper.
- ► Calibrate chart recorder to match upper chamber temperature.

3.4.1 Chart Recorder Access

Open door by either pressing and releasing, or by pulling door open.

3.4.2 Install Chart Paper

1. Press and hold **C** button. When stylus begins to move left, release button. The LED flashes to indicate current temperature range.
2. When stylus stops moving, remove chart knob then move knob up and away.
3. Place chart paper on chart recorder.
4. Gently lift stylus and rotate paper so current time line corresponds to time line groove.



5. Hold chart paper and reinstall chart knob.

NOTE For accurate temperature reading, ensure that current time is aligned with time line groove when chart knob is tightened.

6. Confirm temperature range is set to the correct value.
7. Press and hold **C** button. When stylus begins to move right, release button.
8. Confirm stylus is marking temperature correctly.

4 References and Compliance

4.1 Alarm Reference

If an alarm condition is met, an alarm activates. Some alarms are visual only; others are visual and audible. Some alarms are sent through the remote alarm interface.

The table indicates if an alarm is audible (A), visual (V), or sent through the remote alarm interface (R).

Alarm	Alarm Type
High Temperature	A, V, R
Low Temperature	A, V, R
Compressor Temperature	A, V, R (i.Series)
Door Open (Time)	A, V, R
Power Failure	A, V, R
Low Battery	V (i.Series)
No Battery	A, V, R (i.Series)
Probe Failure	A, V, R
Communication Failure	A, V, R (i.Series)

4.2 Regulatory Compliance

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This device complies with the requirements of directive 93/42/EEC concerning Medical Devices, as amended by 2007/47/EC.

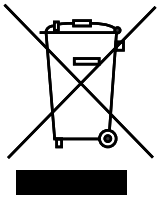
Sound level is less than 70 dB(A).

EC REP

Emergo Europe
Molenstraat 15
2513 BH
The Hague, Netherlands

RoHS COMPLIANT

4.3 WEEE Compliance



The WEEE (waste electrical and electronic equipment) symbol (right) indicates compliance with European Union Directive WEEE 2002/96/EC and applicable provisions. The directive sets requirements for labeling and disposal of certain products in affected countries.

When disposing of this product in countries affected by this directive:

- ► Do not dispose of this product as unsorted municipal waste.
- ► Collect this product separately.
- ► Use collection and return systems available locally.

For more information on the return, recovery, or recycling of this product, contact your local distributor.

5 Warranty

5.1 Rel.i™ Product Warranty USA and Canada

For technical service needs, please contact Helmer at 800-743-5637 or www.helmerinc.com. Have the model and serial number available when calling.

5.1.1 Rapid Resolution

When a warranty issue arises it is our desire to respond quickly and appropriately. The service department at Helmer is there for you. Helmer will oversee the handling of your warranty service from start to finish. Therefore, Helmer must give advance authorization for all service calls and/or parts needs relating to a warranty issue. Any repeat service calls must also be authorized as well. This allows for proper diagnosis and action. Helmer will not be responsible for charges incurred for service calls made by third parties prior to authorization from Helmer. Helmer retains the right to replace any product in lieu of servicing it in the field.

5.1.2 Compressor

For the warranty period listed below, Helmer will supply the refrigeration compressor, if it is determined to be defective, at no charge, including freight. Helmer will not be liable for installation, refrigerant, or miscellaneous charges required to install the compressor beyond the first year of the warranty period.

- ► i.Series model compressor warranty period is five (5) years.
- ► Horizon Series model compressor warranty period is three (3) years.

5.1.3 Parts

For a period of two (2) years, Helmer will supply at no charge, including freight, any part that fails due to defects in material or workmanship under normal use, with the exception of expendable items. Expendable items such as glass, filters, light bulbs, and door gaskets are excluded from this warranty coverage. Inspection of defective parts by Helmer will be final in determining warranty status. Warranty procedures must be followed in all events.

5.1.4 Labor

For a period of one (1) year, Helmer will cover repair labor costs (including travel) and the cost of refrigerant and supplies necessary to perform authorized repairs. Repair service must be performed by an authorized Helmer service agency following the authorization process detailed above. Alternatively, your facility's staff may work with a Helmer technician to make repairs. Labor costs for repairs made by unauthorized service personnel, or without the assistance of a Helmer technician, will be the responsibility of the end user.

5.1.5 Additional Warranty Information

The time periods set forth above begin two (2) weeks after the original date of shipment from Helmer. Warranty procedures set forth above must be followed in all events.

THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE SHALL APPLY.

THE LIABILITY, IF ANY, OF HELMER FOR DIRECT DAMAGES WHETHER ARISING FROM A BREACH OF ANY SALES AGREEMENT, BREACH OF WARRANTY, NEGLIGENCE, OR INDEMNITY, STRICT LIABILITY OR OTHER TORT, OR OTHERWISE WITH RESPECT TO THE GOODS OR ANY

SERVICES IS LIMITED TO AN AMOUNT NOT TO EXCEED THE PRICE OF THE PARTICULAR GOODS OR SERVICES GIVING RISE TO THE LIABILITY. IN NO EVENT SHALL HELMER BE LIABLE FOR ANY INDIRECT, INCIDENTAL, CONSEQUENTIAL, OR SPECIAL DAMAGES, INCLUDING WITHOUT LIMITATION DAMAGES RELATED TO LOST REVENUES OR PROFITS, OR LOSS OF PRODUCTS.

This warranty does not cover damages caused in transit, during installation by accident, misuse, fire, flood, or acts of God. Further, this warranty will not be valid if Helmer determines that the failure was caused by a lack of performing recommended equipment maintenance (per Helmer manual) or by using the product in a manner other than for its intended use. Installation and calibration are not covered under this warranty agreement.

5.2 Outside of USA and Canada

Consult your local distributor for warranty information.

Section II: i.Series® Models

6 Product Configuration

6.1 Install Battery for Backup Power

The monitoring system and chart recorder each have a battery system, enabling a period of continuous operation if power is lost.

NOTE

- The optional Access Control system uses the monitoring system battery for backup power, in the event of a power failure.
- The monitoring system will start on battery power alone. If the freezer was previously not connected to AC power and the battery is switched on, the monitoring system will begin running on battery power.

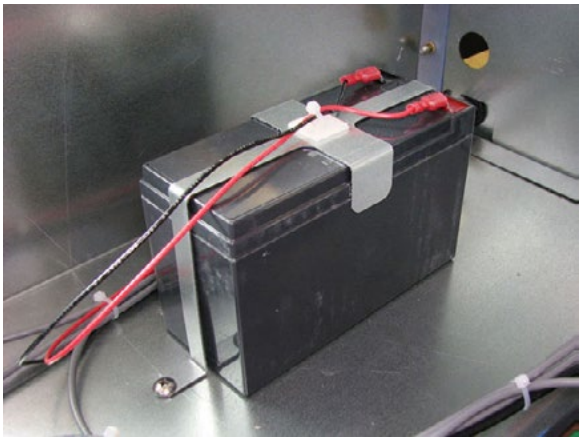
Battery life varies by manufacturer as well as voltage level remaining. Providing full power is available and no battery-related alarms are active, backup power for the monitoring system is available for up to 20 hours (the Low Battery alarm will activate after approximately 18 hours of battery use). Providing full power is available, backup power for the optional Access Control system is available for up to 2.5 hours.

CAUTION

- Before installing or replacing batteries, switch the power and battery OFF. Disconnect the freezer from AC power.
- When installing a replacement battery, use only a battery which meets the manufacturer's specifications.

NOTE If AC power is lost, the monitoring system will automatically disable some features to prolong battery power. Data collection will continue until battery power is depleted.

The battery is located on the top of the freezer.



Monitoring system backup battery (supplies power to optional Access Control system).

Battery is switched off for shipping. Switch battery on to provide monitoring system with backup power in the event of AC power failure.

6.2 Automatic Defrost Cycle

The number of programmed defrost events is dependent on environmental conditions and the frequency of usage. The recommended number of daily defrost cycles is three to four, at even intervals. Defrost events should take place when the freezer door is opened infrequently.

NOTE Depending on the high temperature alarm setpoint and the actual temperature increase during the defrost cycle, frequent door openings may trigger repeated high temperature alarms.

The i.C³ monitoring and control system can perform a maximum of four defrost cycles per day. For information in setting the system time and the time at which each defrost cycle occurs, refer to the i.C³ User Guide.

Defrost Event	On/Off	Default Time
1	On	12:00 AM
2	On	8:00 AM
3	On	4:00 PM
4	Off	6:00 PM

NOTE There must be a minimum of four hours between defrost cycles.

6.3 External Monitoring Devices

The remote alarm interface is a relay switch with three terminals:

- Common (COM)
- Normally Open (NO)
- Normally Closed (NC)

Terminals are dry contacts and do not supply voltage. Interface circuit is either normally open or normally closed, depending on terminals used.

Requirements for your alarm system determine which alarm wires must connect to terminals.

CAUTION

- The interface on the remote alarm monitoring system is intended for connection to the end user's central alarm system(s) that uses normally-open or normally-closed dry contacts.
- If an external power supply exceeding 30 V (RMS) or 60 V (DC) is connected to the remote alarm monitoring system's circuit, the remote alarm will not function properly; may be damaged; or may result in injury to the user.

The terminals on the remote alarm interface have the following maximum load capacity:

- 0.5 A at 30 V (RMS): 1.0 A at 24 V (DC)

6.3.1 Connect to Remote Alarm Interface

1. Switch AC ON/OFF switch OFF. Switch battery switch OFF.
2. On the electrical box, locate the remote alarm terminals.
3. Connect remote alarm wires to appropriate terminals, according to requirements for your alarm system.
4. Use a cable tie to relieve strain on alarm wires (as necessary).
5. Switch AC ON/OFF switch ON. Switch battery switch ON.
6. Touch **Mute** to disable the high temperature alarm while freezer reaches operating temperature.

6.4 Move Drawers, Shelves, and Baskets

Storage features.

CAUTION
- ► Before moving drawers, ensure they are completely empty for safe lifting.
- ► Maximum basket, drawer, or shelf load is 100 lbs (46 kg).

NOTE Before moving storage components, protect stored items in freezer from extended exposure to adverse temperature.

Remove a drawer or basket

1. Pull drawer or basket out until it stops.
2. Tilt the front of the drawer or basket upward.
3. Pull drawer or basket free of the slides.

Install a drawer or basket

1. Align end guides on drawer or basket with the slides.
2. Gently push drawer or basket into chamber until it stops.
3. Pull drawer or basket out until it stops; check for smooth operation.

Remove a shelf

1. With one hand, lift front edge of the shelf from the front brackets.
2. With the other hand, reach under the shelf and bump rear edge of the shelf upward to disengage rear brackets.

Install a shelf

1. Insert shelf into chamber, placing it on brackets.
2. Gently bump rear edge of the shelf downward to engage brackets.
3. Pulling shelf forward gently; shelf should not disengage from rear brackets.

6.5 Move Slides and Brackets

Remove drawer slides

1 Using a screwdriver, remove front bracket retainers.
2 Tap front brackets upward to disengage standards.
3 Remove slides from standards.

Install drawer slides

1 Insert slides into standard at appropriate height.
2 Tap front brackets downward to engage standards.
3 Using a screwdriver, install front bracket retainers.

Remove shelf brackets

1 Using a screwdriver, remove front bracket retainers.
2 Tap front brackets upward to disengage standards.
3 Remove front brackets from standards.

Install shelf brackets

1 Insert front brackets into standard at appropriate height.
2 Tap front brackets downward to engage standards.
3 Using a screwdriver, install front bracket retainers.

6.6 Level the Freezer

NOTE
- ► Leveling feet are optional.
- ► Helmer recommends the use of leveling feet.
- ► A bubble level may be used to ensure the freezer is level.

Leveling feet must be adjusted to provide unit cooler drainage.

Front-to-back

1 Using a wrench, raise or lower leveling feet.
2 When freezer is properly leveled, bottom of the unit cooler will slope downward from front to back (toward the condensate drain line).

Side-to-side

1 Using a wrench, raise or lower leveling feet.
2 When freezer is properly leveled, bottom of the unit cooler will be horizontal (parallel to the floor).

6.7 Optional Adapter Kits for Medication Dispensing Locks

Contact Helmer Technical Service or your distributor for service documentation pertaining to medication dispensing locks.

7 Settings

Through the i.C³ monitoring and control system, current settings may be viewed and changed. To view settings, touch **Home**, **i.C³ APPS**, **Settings**. Use a touch-drag motion to scroll up or down to display additional settings.

NOTE

- If the Settings screen is password protected or if viewing settings for the first time, enter factory default password of “1234”.
- When there is no interaction for two minutes, the Temperature Setpoint screen closes and returns to the Home screen.
- Default values for general settings, alarm settings, and display settings are available in the i.C³ User Guide.
- Changing temperature settings affects operation of the freezer. Do not change settings unless instructed in product documentation or by Helmer Technical Service.

The i.C³ temperature monitor and controller is programmed at the factory. To change a setting, first enter the Settings mode, then the setting. The method for accessing the Settings mode for each setting varies.

7.1 Home Screen

The Home screen appears when:

- The **Home** button is touched from any other screen
- There is no interaction for two minutes on any screen other than those used to enter a password

7.1.1 Home Screen Functions

NOTE Refer to the i.C³ User Guide for options available on all i.C³ screens.

- View current temperature readings
- View the current system time and date
- Access any of the five customizable applications (touch **i.C³ APPS** for additional applications)
- View detailed information about current or previous alarm events or door open data
- View whether the monitoring system is running on battery power
- Mute audible alarms
- Turn the chamber light on and off
- View a graph of the chamber temperature

7.2 Temperature Settings

Temperature setpoint values are programmed at the factory. Setpoints can be viewed and changed through the i.C³ monitoring and control system. To view temperature setpoints, touch **Home**, **i.C³ APPS**, **Settings**. Details for each setpoint are displayed.

Temperature Controller Programs screen.

NOTE Default chamber temperature setpoint is -30.0 °C.

Change the setpoint if:

► Your organization requires a chamber temperature other than -30.0 °C.

NOTE If the Settings screen is password protected or if viewing settings for the first time, enter factory default password of “1234”.

Perform the following:

1 Touch **i.C³ APPS**, **i.C³ Settings**.
2 Enter the Settings password.
3 Touch **Temperature Setpoints**.
4 Touch **+** or **–** on the **Temperature Setpoint** spin box.
   ► The setpoint is the temperature at which the freezer operates.
5 Touch **+** or **–** on the **Hysteresis Setpoint** spin box.
   ► The hysteresis setpoint is the allowable fluctuation in temperature, relative to the temperature setpoint.
   ► A lower hysteresis setpoint will limit the temperature variation to a smaller range.
   ► A higher setpoint will allow the temperature to vary across a larger range.

NOTE Hysteresis is factory-preset and should not be changed unless directed by Helmer Technical Service.

6 Touch **+** or **–** on the **Delay on Start-Up** spin box.
   ► Compressor startup is delayed to allow the i.C³ monitoring and control system to start first.
7 Touch **+** or **–** on the **Duty Cycle of Control Relay during Probe Failure** spin box.
   ► The duty cycle is the percentage of time the compressor will run in the event of a temperature control probe failure.

8 Touch plus **+** or **–** on the **Defrost Time** spin box.

► The defrost time is the maximum allowable duration which the defrost probe will heat the evaporator. This value is set to prevent the chamber temperature from increasing excessively due to a long defrost cycle.

Setting	Initial Factory Value
Temperature Setpoint	-30.0 °C
Hysteresis Setpoint	2.0 °C
Delay on Start-Up	2 minutes
Duty Cycle of Control Relay during Probe Failure	100%
Defrost Time	15 minutes

7.3 Temperature Calibration

Temperature calibration values are programmed at the factory. Calibration values can be viewed and changed through the i.C³ monitoring and control system. To view calibration settings, touch **Home**, **i.C³ APPS**, **Settings**. Details for each setting are displayed.

Temperature Calibration screen.

NOTE

► If the Settings screen is password protected or if viewing settings for the first time, enter factory default password of “1234”.

► When there is no interaction for two minutes, the Temperature Setpoint screen closes and returns to the Home screen.

► Control Sensor and Control Sensor Offset, Evaporator Defrost and Evaporator Defrost Offset, and Compressor Probe Temperature calibration settings are factory-preset and should not be changed unless directed by Helmer Technical Service.

7.3.1 Calibrate Monitor Probes

Verify monitor probes are reading chamber temperature correctly by comparing monitor probe readings to temperature read by an independent thermometer. If monitor probes are not reading correctly, change the value displayed on the monitor.

NOTE

► Ensure product simulation bottle is full of solution.

► Probes in the bottles are connected to the monitoring system and sense chamber temperature. These probes do not affect freezer setpoint.

Obtain:

► Calibrated reference thermometer, independent and traceable per national standards.

► Tape or wire ties to attach thermometer to monitor probe.

Calibrate probes:

1 Remove upper monitor probe from the upper probe bottle.
2 Unscrew the cap from the bottle.
3 Attach the thermometer to the monitor probe, and place them in the bottle. The probe and thermometer should be immersed at least 2” (50 mm).
4 Close the door and allow the chamber temperature to stabilize for 10 minutes.
5 Observe and note the thermometer temperature.
6 Touch, **i.C³ APPS**, **Settings**, **Temperature Calibration**.
7 Touch **+** or **–** on the **Upper Temperature** spin box to increase or decrease the value to match the measured value. The message “New Setting Saved” appears next to the spin box.

NOTE After saving the new temperature value, the displayed temperature may not match the new value. This is normal.

9 Remove thermometer from probe.
10 Replace bottle cap, ensuring a tight fit.
11 Place probe in bottle, immersing at least 2” (50 mm).

7.3.2 Control Sensor Offset

The temperature controller senses unit cooler temperature through the control probe in the unit cooler. The unit cooler temperature typically varies from the chamber temperature, so an offset value is used by the control system to compensate for the difference.

The temperature controller adjusts chamber temperature around the freezer setpoint by activating the compressor when the control probe registers above the setpoint.

Determine control sensor offset:

NOTICE
- ► Control Sensor Offset is factory-preset and should not be changed. Contact Helmer Technical Service for instructions regarding changing the Control Sensor Offset.
- ► Upper monitor temperature must be verified and accurate prior to adjusting the Control Sensor Offset.

1 View and record the Freezer Setpoint. (Reference **Section II**, **Item 7.2.1**)
2 Allow the unit to run with calibrated monitor temperature for several compressor cycles, and record the average monitor temperature .
3 View and record the current Control Offset value.
4 Subtract the Freezer Setpoint from the average monitor temperature and record the difference.
5 Add the current Control Offset value to the recorded difference determined in the previous step to establish the new Control Offset value.

EXAMPLE
1 Freezer Setpoint is 4.0
2 Average monitor temperature is 5.2
3 Current Control Offset is 0.3
4 Subtract: 5.2 - 4.0 = 1.2; difference between average temperature and setpoint
5 Add 0.3 + 1.2 = 1.5; new Control Offset value

Enter the new offset value:

1 Touch **Home**, **i.C³ APPS**, **Settings**.
2 Enter the Settings password.
3 Touch **Temperature Calibration**.

5 Touch **+** or **–** on the **Control Sensor Offset** spin box.
   ► Raise the offset value to lower chamber temperature; lower the offset value to raise chamber temperature.
6 Touch **Home** to return to home screen.

7.3.3 Calibrate Compressor and Evaporator Probe

The compressor and evaporator temperature probes have been factory-calibrated. Changing the calibration settings is not typically necessary and should not be performed unless directed by Helmer Technical Service.

7.3.4 Factory Default Settings

Settings listed below may be simultaneously returned to factory default values.

NOTE The factory default settings may not be the same as the settings that were factory-calibrated before the freezer was shipped.

Setting	Restored Value
Home Screen Application Icons	i.C³ APPS, Temperature Alarm Test, Temperature Graph, Information Logs, Download
Display Brightness	High (3 symbols)
Password (for Settings screen)	1234
Sounds	On
Alarm Volume	9
Alarm Tone	On
Temperature Calibration Values	Values previously entered during setup
Unit ID	Serial number entered at factory
Date Format	MM/DD/YYYY
Day	Not affected (maintained in real-time clock)
Month	
Year	
Time Format	12-hour
Minute	Not affected (maintained in real-time clock)
Hour	
AM/PM	
Language	Language previously selected during setup
Temperature Units	°C
Password Protection (for Settings screen)	On
Temperature Graph Screensaver	On
Access Control (optional) as Home Page	On
High Temperature Alarm Setpoint	-20.0 °C
High Temperature Alarm Time Delay	0 minutes
Low Temperature Alarm Setpoint	-35.0 °C
Low Temperature Alarm Time Delay	0 minutes
Power Failure Alarm Time Delay	1 minute
Probe Failure Alarm Time Delay	0 minutes

Setting	Restored Value
Door Open (Time) Alarm Time Delay	3 minutes
Compressor Temperature Alarm Setpoint	50.0 °C
Compressor Temperature Alarm Time Delay	0 minutes
Chamber Setpoint	-30.0 °C
Chamber Hysteresis	2.0 °C
Delay on Start-Up	2 minutes
Control Relay Probe Failure Duty Cycle	100%
Defrost Event #1 On/Off	On
Defrost Event #1 Start Time	12:00 AM
Defrost Event #2 On/Off	On
Defrost Event #2 Start Time	8:00 AM
Defrost Event #3 On/Off	On
Defrost Event #3 Start Time	4:00 PM
Defrost Event #4 On/Off	Off
Defrost Event #4 Start Time	6:00 PM
Defrost Time/Defrost Safety Operation Time	15 minutes

7.3.5 Restore Factory Default Settings

1 Touch **Home**, **i.C³ APPS**, **Settings**, **Restore Factory Settings**.

2 A “Are you sure you want to restore factory settings?” message appears. Do one of the following:

- ► Touch **Yes**. The message screen closes and factory settings are restored.
- ► Touch **No**. The message screen closes and factory settings are not restored.

7.3.6 Change Factory Settings

Several of the freezer operating parameters are configured at the factory. The settings listed below are set at the factory, and may be changed at the direction of Helmer Technical Service.

Setting	Description
Temperature Controller Page	Enable or disable the temperature controller screen

Factory settings may be viewed and changed. Contact Helmer Technical Service to verify if changing factory settings is necessary, and for instructions in accessing Factory Settings screen.

7.4 Test Alarms

Test alarms to ensure they are working correctly. The freezer has alarms for chamber temperature, compressor temperature, door open (time), power failure, low battery, and power failure.

7.4.1 Automatic Chamber Temperature Alarm Test

NOTE

- Test can be aborted by touching **Cancel Test**.
- Test takes less than five minutes.
- If the temperature alarm test does not automatically complete within two minutes, restart the i.C³ monitoring system.

When performing an automatic temperature alarm test, the Peltier device heats or cools the monitor probe until the high or low alarm setpoint is reached. An event is added to the Event Log to indicate a temperature alarm was activated. The Alarm Test icon is displayed on the Temperature Graph to indicate the temperature alarm was test-induced.

Test the low alarm:

1. Identify current setting for low alarm setpoint.
2. Touch **Home**, **i.C³ APPS**, **Temperature Alarm Test**.
3. Touch **Low Alarm Test**.
4. “Peltier Test Probe Cooling” message appears.
5. When displayed temperature reaches the alarm setpoint, temperature reading turns red.
6. When completed, “Test Complete” appears.
7. Touch **Home**, **i.C³ APPS**, **Information Logs**, **Event Log**. Touch the event to view event details.
8. Observe the temperature at the time of the low temperature alarm event. Compare this to the alarm setpoint. If values do not match, refer to **Section II, Item 9** (Troubleshooting).

Test the high alarm:

1. Identify current setting for high alarm setpoint.
2. Touch **Home**, **i.C³ APPS**, **Temperature Alarm Test**.
3. Touch **High Alarm Test**.
4. “Peltier Test Probe Warming” message appears.
5. When displayed temperature reaches the alarm setpoint, the temperature reading turns red.
6. When completed, “Test Complete” appears.
7. Touch **Home**, **i.C³ APPS**, **Information Logs**, **Event Log**. Touch the event to view event details.
8. Observe the temperature at the time of the high temperature alarm event. Compare this to the alarm setpoint. If values do not match, refer to **Section II, Item 9** (Troubleshooting).

Cancel the test:

1 Touch **Home**, **i.C³ APPS, Temperature Alarm Test**.
2 Touch **Cancel Test**.

NOTE When cancelling an automatic test, the message indicating the test is in progress clears immediately. If a setpoint was reached before the test was cancelled, the alarm activates and clears as described earlier.

7.4.2 Manual Chamber Alarm Test

NOTE Before testing alarms, protect items in freezer from extended exposure to adverse temperature.

Obtain:

► (1) 4 oz. (120 mL) glass of product simulation solution (1:1 ratio of water to propylene glycol or equivalent low-temperature fluid).

NOTE Temperature probes are fragile; handle with care.

Test the high alarm:

1 Identify setting for high alarm setpoint.
2 Place the glass of product simulation solution in the freezer.
3 When the product simulation solution has stabilized at the chamber temperature, remove the solution from the freezer.
4 Remove the monitor probe from the probe bottle and insert into the product simulation solution.
5 Observe the temperature on the i.C³ display at which the high temperature alarm sounds.
6 Compare the temperature at which the alarm sounds to the high alarm setpoint. If values do not match, refer to **Section II, Item 9** (Troubleshooting).
7 Remove probe from product simulation solution.
8 Place monitor probe in probe bottle, immersing it at least 2” (50 mm).

7.4.3 Power Failure Alarm Test

NOTE During a power failure, the power failure alarm sounds and the battery provides power to the monitoring system.

1 Change Power Failure delay setting to 0 minutes.
   a Touch **Home**, **Settings**, **Alarm Settings**.
   b Touch **+** or **–** on the Power Failure spin box to change the value to 0.
2 Switch AC ON/OFF switch OFF. Power failure alarm will activate immediately.
3 Switch AC ON/OFF switch ON. Power failure alarm will clear and audible alarm will cease.
4 Change Power Failure time delay to the original setting.

7.4.4 Door Open Alarm Test

1 Change Door Open (Time) delay setting to 0 minutes.
   a Touch **Home**, **Settings**, **Alarm Settings**.
   b Touch **+** or **–** on the Door Open (Time) spin box to change the value to 0.
2 Open door. Alarm will activate immediately.
3 Close door. Alarm will clear and audible alarm will cease.
4 Change the Door Open (Time) setting to the original setting.

7.5 Upgrade System Firmware

Helmer may occasionally issue updates for the i.C³ firmware. Follow upgrade instructions included with the firmware update.

7.6 Calibrate the Touchscreen

The i.C³ touchscreen has been calibrated at the factory to ensure that when the screen is touched, the desired key touch is selected. If the i.C³ touchscreen or display circuit board is replaced after the freezer has been shipped from the factory, the touchscreen must be recalibrated. If the screen must be recalibrated, contact Helmer Technical Service to obtain the calibration file.

Calibrate the screen:

1. Insert the flash memory device with the calibration program into the USB port on the i.C³ bezel. The flash memory device can be inserted while any screen displayed on the i.C³.
2. Wait 15 to 30 seconds for the calibration file to load.
3. When the calibration screen appears, remove the flash memory device from the USB port.
4. Follow the on-screen instructions, touching the crosshair icons as they appear on the screen.

NOTE For accurate calibration results and to avoid damage to the touchscreen, touch the crosshairs with the eraser end of a pencil.

5. After all crosshairs have been touched, the i.C³ will reboot and display the language screen.

NOTE

- For accurate calibration results and to avoid damage to the touchscreen, touch the crosshairs with the eraser end of a pencil.
- If the screen was unintentionally touched outside of any of the crosshair icons, the screen may be recalibrated using the process outlined above.

7.7 View Manufacturer and Product Information

View version information for contacting Helmer.

1. Touch **i.C³ APPS**, **Contact Helmer**.
2. Manufacturer contact information appears.
3. Software version appears.

8 Maintenance

NOTE
- ► Refer to the operation manual for the preventive maintenance schedule.
- ► Before performing maintenance, protect items in freezer from extended exposure to adverse temperature.
- ► Allow freezer temperature to stabilize at setpoint after performing service or after extended door opening.

8.1 Recharge Refrigerant

CAUTION
- ► Review all safety instructions prior to recharging refrigerant. Refer to **Section I, Item 2** (Safety).
- ► Maintenance should only be performed by trained refrigeration technicians.

NOTE Use only non-CFC R-404A refrigerant.

Full initial refrigerant charge varies by model and power requirements, which can be found on the product specification label.

Model	Power Requirements	Initial Charge
120 and 125 models	Any	29.0 oz. (822 g)

Obtain:
- ► Refrigerant
- ► Calibrated pressure gauge (0 psi to 220 psi (0 kPa to 1520 kPa))

Add refrigerant:

1 Attach pressure gauge to the fittings on the refrigeration lines.

2 Monitor the low side (suction) pressure through a full compressor cycle.

3 Measure the pressure at the end of the next cycle, immediately before the compressor stops.

NOTE Pressure varies depending on ambient air temperature.

4 Add refrigerant. Check the pressure on the high side and the low side.
- ► Low side = 2 psi to 4 psi (14 kPa to 28 kPa)
- ► High side = 180 psi to 220 psi (1241 kPa to 1520 kPa)

5 Remove pressure gauge.

8.2 Check Monitoring System Battery

On all i.C³ screens, the Battery icon will appear in the header bar when the system is running on battery power and the screen brightness will automatically be reduced. The monitoring system will automatically disable some features to extend battery life.

Check the battery:

1 Switch AC ON/OFF switch OFF.
   - **a** Screen should continue to display information with reduced brightness.
   - **b** Battery icon will appear on the screen.
   - **c** If the display is blank, replace battery.

2 Switch AC ON/OFF switch ON.

NOTE Use a battery which meets manufacturer's specifications.

8.3 Check Optional Access Control System Battery

During an AC power failure, the Access Control backup battery provides backup power to power the magnetic Access Control lock. Test the Access Control backup battery to ensure it is working properly.

Check the battery:

1 Ensure monitoring system / Access Control battery key switch is switched ON.
2 Switch AC ON/OFF switch OFF.
3 Attempt to open the cabinet door.
   - ► If the door remains locked, the battery is functional.
   - ► If the door does not remain locked, replace the battery.
4 Switch AC ON/OFF switch ON.

8.4 Clean the Freezer

8.4.1 Condenser Grill

CAUTION Disconnect freezer from AC power when cleaning condenser grill.

In environments where freezer is exposed to excessive lint or dust, condenser grill may require cleaning more frequently than stated in preventive maintenance schedule.

Clean the condenser grill using a soft brush and a vacuum cleaner.

8.4.2 Exterior

Clean exterior surfaces with soft cotton cloth and non-abrasive liquid cleaner.

8.4.3 Interior

Clean painted surfaces with mild detergent. Clean stainless steel surfaces with a general-purpose laboratory cleaner suitable for stainless steel.

8.4.4 Door Gaskets

Clean with soft cloth and mild soap and water solution.

8.4.5 Clean and Refill Probe Bottles

Obtain:

- ► Fresh water-bleach solution (not provided)
  - ► 1:9 ratio of bleach to water
  - ► Bleach is 5% solution of commercial sodium hypochlorite (NaOCl)
  - ► Equivalent oxidizing cleaner/disinfectant approved by your organization may be substituted
- ► 4 oz. (120 mL) of product simulation solution per bottle
  - ► Solution is a 1:1 ratio of water to propylene glycol (or equivalent low-temperature fluid)

Clean and refill bottles:

1. Remove probe from bottle.
2. Remove bottle from bracket.
3. Clean bottle with water-bleach solution.
4. Fill bottle with 4 oz. (120 mL) of product simulation solution.
5. Cap bottle tightly to minimize evaporation.
6. Place bottle in bracket.
7. Replace probe, immersing at least 2” (50 mm).

8.4.6 i.C³® Touchscreen

Clean touchscreen with a soft, dry cotton cloth.

8.5 Defrost the Unit Cooler

Defrost events may be scheduled to occur at specific times. A defrost event can be triggered on demand without affecting a programmed defrosting schedule.

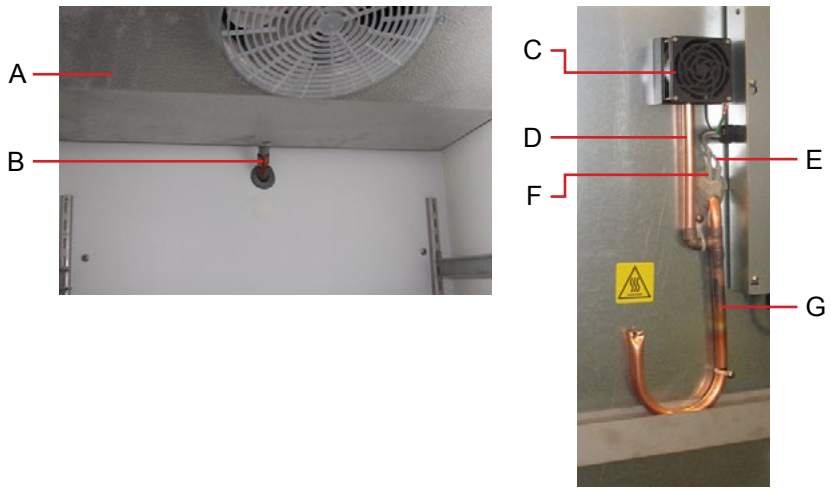
1. Touch **i.C³ APPS**, **Temperature Setpoints**.
2. Touch the **Manual Defrost: Start** button.
   - ► The Defrost icon will appear for the duration of the defrost cycle.
3. To cancel, touch the **Manual Defrost: Stop** button.

8.6 Unit Cooler Removal and Installation

If unit cooler cover is not removed as detailed in this procedure the drain port may be damaged. Improper drainage may result in excessive icing and freezer's inability to maintain temperature.

Required tools:

- ► 5/16" socket wrench
- ► Tool to push putty away from the drain tube



Drain tube, fan, and heater components.

Label	Description
A	Unit cooler cover
B	Drain port
C	Drain fan
D	Fan tube
E	Heater wires
F	Heating element
G	Drain tube

8.6.1 Remove the Unit Cooler Cover

1 Switch AC ON/OFF switch OFF. Switch battery switch OFF.

2 On the back of the cabinet, peel the putty back to expose the drain tube (G) and drain heater (F).

CAUTION The condensate evaporator and water evaporation tray are hot.

3 Verify the heating element is cool. Remove the screws and loosen the pipe straps securing the drain tube to the cabinet.

4 Remove the drain heater from the drain tube.

5 Remove the drain tube (G) by pulling it downward. The drain tube should separate from the fan tube (D) at the 90° elbow, leaving the fan tube (D) attached to the fan (C).

- **a** Separate the drain hose inside the cabinet from the unit cooler drain port (B).
- **b** Gently twist the drain hose from left to right to separate it from the unit cooler drain port.
- **c** Pivot the drain tube and drain hose upward then remove the assembly from the cabinet.

6 Remove top drawer, basket, or shelf from the chamber.

NOTE For iPF models, remove the Cold-Shield panel. Loosen three screws securing the panel to the cabinet then slide the panel to free it from the screws.

7 Remove the unit cooler cover (A).
- **a** Hold unit cooler cover in place to prevent it from dropping.
- **b** Use the socket wrench to remove four screws securing the unit cooler cover.
- **c** Carefully lower unit cooler cover to avoid damage to the fan wiring.

8.6.2 Install the Unit Cooler Cover

1 Verify unit cooler wiring is connected and routed correctly.
- **a** Wiring should be routed above copper tube inside the unit cooler.
- **b** Reconnect wires if they have separated.

2 Attach unit cooler cover.
- **a** Lift unit cooler cover into place.
- **b** Front edge of the cover should be behind the unit cooler case.
- **c** Use the socket wrench to install four screws to secure the unit cooler cover.

3 Insert the drain tube and drain hose through the hole in the cabinet.
- **a** Push drain tube and drain hose upward at an angle, toward the unit cooler drain port.
- **b** Pivot the drain tube and drain hose downward then push the assembly upward.
- **c** In the chamber, push the drain hose onto the drain hose.

4 Attach the drain tube to the fan tube.

5 Insert the drain line heater in the drain tube.
- **a** Insert the heater at an upward angle.
- **b** The black heating element should no longer be visible.

6 On the back of the cabinet, press putty around the drain tube and drain line heater.

7 Reinstall top drawer, basket, or shelf if previously removed.

NOTE For iPF models, reinstall the Cold-Shield panel.

8 Reattach the pipe straps to secure the drain tube to the cabinet.

9 Switch AC ON/OFF switch ON. Switch battery switch ON.

10 Touch **Mute** to disable the high temperature alarm while freezer reaches operating temperature.

9 Troubleshooting

CAUTION Review all safety instructions prior to troubleshooting. Refer to **Section I, Item 2** (Safety).

9.1 General Operation Problems

Problem	Possible Cause	Action
A drawer does not slide easily.	Debris in the drawer slides.	► Pull the drawer out and confirm the slides are free of debris. Clean if necessary.
	Drawer slides are not lubricated.	► Using a multi-purpose grease, lubricate the bearings in the slides.
	Ice buildup in the drawer slides.	► Pull the drawer out and confirm the slides are free of ice. De-ice if necessary.
	Drawer is misaligned or not level.	► Confirm both slides for the drawer are mounted at the same height.
	Drawer slide is faulty.	► Confirm the slide is operating correctly. Replace if necessary.
The door does not open easily.	Debris in the hinges.	► Confirm the hinges are free of debris. Clean the hinges if necessary.
	Door hinges are not lubricated.	► Using a general-purpose grease, lubricate the pivots in the hinges.
	Hinge cam is faulty.	► Confirm the hinge cam is not damaged. Replace the cam if necessary.
The monitor display is hard to read.	Screen brightness is set too low.	► Change the screen brightness.
The alarm monitor is not responding.	Digital electronics are locked because of an interruption in power.	► Reset the monitoring system.
“Probe Failure” is displayed on the monitor.	Defrost probe or monitor probe wiring is an open circuit.	► Check the continuity of the probe wiring and connections. Secure the connections if necessary. ► Confirm the probe is providing resistance in the range of 86 Ω to 110 Ω. Replace the probe if necessary.

9.2 Chamber Temperature Problems

Problem	Possible Cause	Action
The chamber temperature displayed is higher or lower than the actual temperature.	Upper monitor probe(s) is not calibrated.	► Check the chamber temperature calibration. Change the calibration if necessary.
	Connections for the upper monitor probe are loose.	► Check the upper monitor probe connections. Secure the connections if necessary.
	Upper monitor probe wiring is an open circuit.	► Check the continuity of the probe wiring. Replace the probe if necessary.
	Probe bottle is empty, or the amount of solution is too low.	► Check the level of product simulation solution in the bottle. Clean and refill the bottle if necessary.
	Solution in the probe bottle is frozen.	► Refill the bottle with new solution.
	Digital electronics are locked because of an interruption in power.	► Reset the monitoring system.
	Monitor is not calibrated.	► Confirm the upper monitor probe is reading correctly. Calibrate the upper monitor probe if necessary.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
The chamber temperature meets an alarm condition, but the appropriate temperature alarm is not active.	Temperature alarm setpoint was changed.	► Check the current setpoints for the temperature alarms. Change the setpoints if necessary.
The compressor runs continuously.	Freezer setpoint is set too low.	► Confirm the setpoint is set within the operating range and change it if necessary.
	Control probe in the unit cooler is faulty.	► Replace the probe if necessary.
	Temperature monitor/ control board is faulty.	► Confirm the temperature controller or monitor/ control board is operating correctly. Replace it if necessary.
	Compressor starting relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.
	Defrost timer is faulty.	► Replace the defrost timer.

Problem	Possible Cause	Action
The chamber temperature does not stabilize at the freezer setpoint.	Temperature monitor/ control board is faulty.	► Confirm the temperature controller or monitor/ control board is operating correctly. Replace it if necessary.
	Condensing unit fan is not running.	► Check the condensing unit fan connections. Replace the fan motor if necessary.
	Unit cooler fan is not running.	► Check the voltage to the fan when door switch is activated. Replace the fan motor or door switch if necessary.
	Compressor motor has seized.	► Replace the compressor.
	Control probe is faulty.	► Replace the probe if necessary.
	Refrigerant level is too low.	► Check the refrigeration lines for leaks and repair them if necessary. Check the refrigerant level. Recharge the refrigerant if necessary.
	Compressor starting relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.
	Condenser grill is dirty.	► Check the condenser grill. Clean it if necessary.
	Circulation in the chamber is not adequate.	► Check if there are any items that may obstruct air flow and remove them if necessary.
	Ambient air temperature around the freezer is too high.	► Confirm freezer location meets requirements. Refer to the operation manual.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	Evaporator is covered with ice and is not exchanging heat.	► Initiate a freezer defrost cycle.

9.3 Alarm Activation Problems

Problem	Possible Cause	Action
The freezer is in an alarm condition, but alarms are not audible.	Alarm system is faulty.	► Confirm the circuit board and line connections are functioning correctly.
	Monitor/control board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	Speaker is faulty.	► Replace the speaker.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	Audible alarms are muted.	► Verify that audible alarms are not muted. If time remaining is greater than five minutes, change MUTE timer value to five minutes and wait until timer resets.

Problem	Possible Cause	Action
The freezer meets an alarm condition, but the appropriate alarm is not active.	Monitor/control board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	Alarm setpoint was changed.	► Check the current setpoints for the alarms.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
The High Temperature alarm activates when the door is opened, then clears shortly after the door is closed.	Connections for the upper monitor probe are loose.	► Check the upper monitor probe connections. Secure the connections if necessary.
	Upper monitor probe is faulty.	► Test the probe. Replace the probe if necessary.
	Unit cooler fan continues to run while the door is open.	► Test the door switch and unit cooler fan connections. Secure the connections if necessary. Replace the door switch or fan motor if necessary.
	Probe bottle is empty.	► Check the level of product simulation solution in the bottle. Clean and refill bottle if necessary.
	High temperature alarm setpoint is set too low.	► Check the setpoint. Change the setpoint if necessary.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
The freezer is connected to power, but the AC Power Failure alarm is active.	Outlet connection is faulty.	► Verify power at the outlet. Repair the original outlet or connect to a different outlet if necessary.
	Power cord is faulty.	► Confirm the power cord is connected securely. Secure the power cord if necessary.
	ON/OFF AC power switch located inside the front lower panel is faulty.	► Replace the ON/OFF AC power switch.
	ON/OFF AC power switch is OFF.	► Turn the ON/OFF AC power switch to the ON position.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	Circuit breaker is tripped.	► Reset or replace the circuit breaker.

Problem	Possible Cause	Action
The Door Open alarm is activating sporadically.	Doors are not closing completely.	► Confirm the hinge cams are not damaged. Replace the cams if necessary.
	Doors are closing but not sealing completely.	► Confirm the door gasket seals completely. Replace the door gasket if necessary.
	Connections for the door switch are faulty.	► Test the switch connections. Secure the connections if necessary.
	Door switch is faulty.	► Replace the door switch.
	Temperature monitor/ controller board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	Door Open Timeout is set to zero, causing the alarm to activate immediately when the door is opened.	► Check the time delay for the Door Open alarm. Change the time delay if necessary.
All alarms are activating sporadically.	Alarm system is faulty.	► Confirm the circuit board and line connections are functioning correctly.
	Monitor/control board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	Compressor is overheating due to lack of airflow.	► Check the condenser grill. Clean if necessary. ► Confirm freezer location meets requirements.
	Condenser alarm setpoint is too low.	► Confirm the alarm setpoint is set at the expected or correct value.
	Refrigerant level is too low.	► Check refrigeration lines for leaks and repair if necessary. Check the refrigerant level. Recharge refrigerant if necessary.

Problem	Possible Cause	Action
The condenser alarm is active.	Refrigerant level is too low.	► Check refrigeration lines for leaks and repair if necessary. Check refrigerant level. Recharge if low.
	Connections for the condenser temperature probe are loose.	► Test the probe connections. Secure the connections if necessary.
	Condenser temperature probe is faulty.	► Test the probe. Replace the probe if necessary.
	Condenser fins are dirty.	► Clean as necessary, or order new ones from Helmer or your distributor.
	Compressor is overheating due to a lack of air flow.	► Check the condenser grill and clean if necessary. ► Confirm the freezer is correctly located. Refer to the operation manual.
	Condenser probe is not calibrated.	► Confirm the condenser probe is reading correctly. Calibrate the probe if necessary.
	Condenser alarm setpoint is too low.	► Confirm the alarm setpoint is at the appropriate value.
	Condenser fan motor is faulty.	► Replace the condenser fan motor.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
An alarm activated, but the temperature recorded at activation does not match the alarm setpoint.	Monitor settings are not calibrated.	► Confirm the monitor probe is reading correctly. Calibrate the probe if necessary.
	Temperature changed slightly around the time of activation.	► No action necessary.
The No Battery alarm is activating sporadically.	Battery voltage level on the backup battery for the monitoring system is low.	► Replace the backup battery for the monitoring system.
The High Temperature alarm is activating sporadically.	Upper monitor probe is not immersed in the product simulation solution.	► Confirm the probe bottle is full of solution, and the probe is placed in the bottle correctly.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	Upper monitor probe is not calibrated.	► Confirm the upper monitor probe is reading correctly. Calibrate the probe if necessary.

9.4 Testing Problems

Problem	Possible Cause	Action
The automatic temperature tests do not work.	Connections for the monitor probe are loose.	► Test the monitor probe connections. Secure the connections if necessary.
	Monitor probe is faulty.	► Test the monitor probe. Replace the probe if necessary.
	Monitor/control board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	High Alarm setpoint is set significantly higher than the default value, or the Low Alarm setpoint is set significantly lower than the default value.	► Confirm the alarm setpoints are set at the expected or correct values. ► Test the temperature alarms manually.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.

9.5 Condensation and Icing Problems

Problem	Possible Cause	Action
There is excessive water in the water evaporation tray inside the lower compartment in the back of the unit.	Humid air is entering the chamber	► Confirm the freezer is level, and the door is aligned, closing tightly, and sealing correctly. Correct issues as necessary.
	Heater in the water evaporation tray is faulty.	► Confirm the heater is hot and is drawing the correct current (approximately 0.21 A to 0.35 A). Replace the heater if necessary.
There is excessive ice in the chamber.	Humid air is entering the chamber.	► Confirm the freezer is level, and the door is aligned, closing tightly, and sealing correctly. Correct issues as necessary.
	Unit cooler drain line is damaged or restricted.	► Confirm the unit cooler drain line is free of debris and is not restricted. Remove debris if necessary.
	Drain line is plugged.	► Confirm the drain tube is free of debris. Remove debris if necessary.
	External drain fan is faulty.	► Confirm the external drain fan is running. Hold a piece of paper in front of the fan and confirm that the paper is being drawn toward the freezer. ► Confirm the connections are secure. Tighten connections if necessary. ► Replace the drain line fan if necessary.
	Connection between the unit cooler and the drain line is loose.	► Confirm the connection is secure. Tighten the connection if necessary.
There is excessive moisture on the door.	Humid air is entering the chamber.	► Confirm the freezer is level, and the door is aligned, closing tightly, and sealing correctly.
	Relative humidity around freezer is too high.	► Confirm freezer location meets requirements.

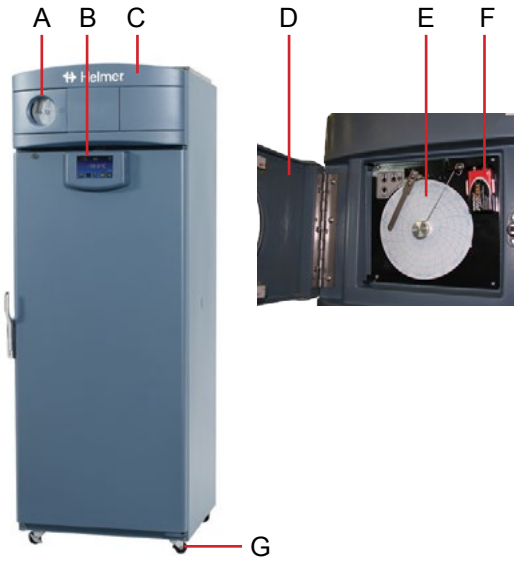
Problem	Possible Cause	Action
After a defrost cycle, no water flows into the water evaporation tray.	Not enough time has elapsed since the end of the defrost cycle.	► Allow approximately 20 minutes after the end of the defrost cycle to check for water in the evaporation tray.
	Drain line is plugged.	► Confirm the drain tube is free of debris. Remove debris if necessary.
	Drain line heater is faulty.	► Confirm the drain line heater is warm to the touch. Contact Helmer Technical Service to resolve issues as necessary.
	Defrost heater on the evaporator in the unit cooler is not working.	► Check for ice buildup on the evaporator by looking through the fan grill with a flashlight. If there is significant ice buildup inside or behind the unit cooler, initiate a defrost cycle of the freezer.
	Defrost heater on the evaporator in the unit cooler is faulty.	► Confirm the drain line heater is hot and is drawing the appropriate current during a defrost event (approximately 3.3 A to 5.5 A). ► Replace the defrost heater if necessary.

10 Parts

NOTE

- ► Before replacing parts, protect items in freezer from extended exposure to adverse temperature.
- ► Allow freezer temperature to stabilize at setpoint after replacing parts or after extended door opening.

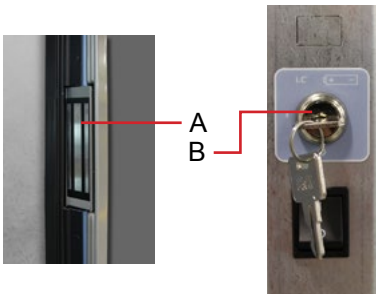
10.1 Front



Left: iPF120 freezer. Right: Chart recorder and door.

Label	Description	Part Number	Schematic Label
A	Temperature chart recorder (standard on plasma freezer model, optional on laboratory model)	800084-1	CA
B	i.C³ monitoring and control system	Refer to subsequent section(s) for part numbers	IQ
C	Bezel with chart recorder door	800069-2	-
	Bezel without chart recorder door	400998-2	-
D	Chart recorder door assembly	800070-1	-
E	Chart paper (52 sheets)	220419	-
F	Chart recorder backup battery	120218	CC
G	Caster (swivel with brake)	220467	-

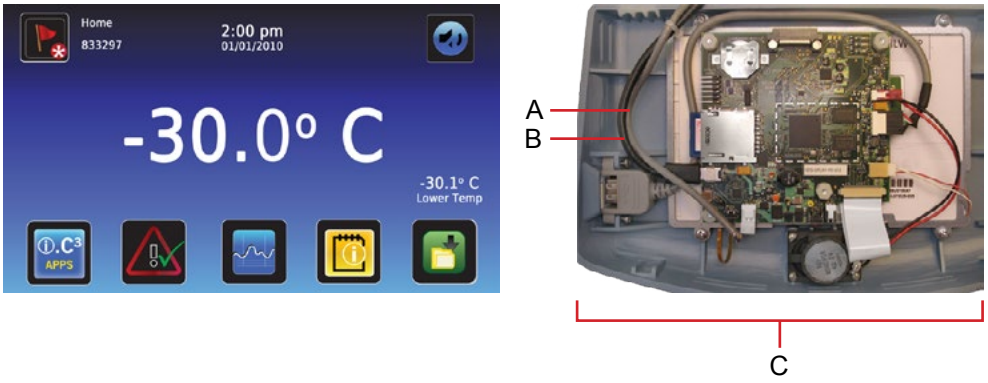
10.1.1 Access Control Option



Access Control features (iPF125 model shown).

Label	Description	Part Number	Schematic Label
A	Magnetic lock	800138-1	AXb
B	Backup battery key switch	401220-1	AXa

10.1.2 Control System and Display



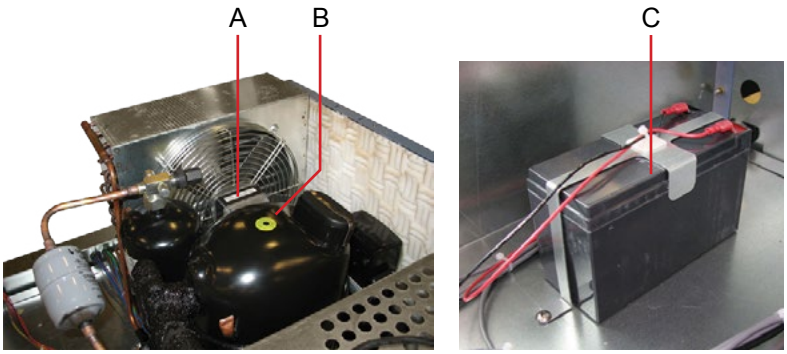
Left: Front view, LCD touchscreen. Right: Rear view showing display board.

Label	Description	Part Number	Schematic Label
A	Interface cable	800010-1	IG
B	Power cable	800010-1	IH
C	Display assembly (includes touchscreen, display board, interface cable, speaker)	800042-1	IQ

NOTE

- The i.C³ display assembly is sensitive to static electricity and can be damaged by electrostatic discharge. Use proper ESD precautions when handling the display assembly.
- Although the touchscreen and display board may be replaced independently of the i.C³ display assembly, Helmer recommends replacing the complete assembly.

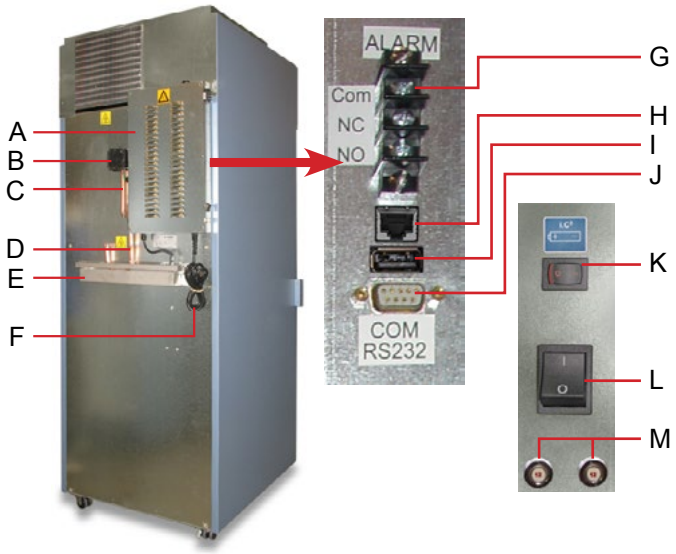
10.2 Top



Top features.

Label	Description	Part Number	Schematic Label
A	Condenser fan motor	230 V, 50 Hz: 120515 230 V, 60 Hz: 120493	K
B	Compressor	230 V, 50 Hz: 400672-3 230 V, 60 Hz: 400672-4	J
C	Monitoring system battery (supplies backup power to optional Access Control system)	120628	IB
Not shown	Condenser probe	800039-1	IL
	Solenoid valve	220547	W
	Solenoid coil	800096-1	V

10.3 Rear

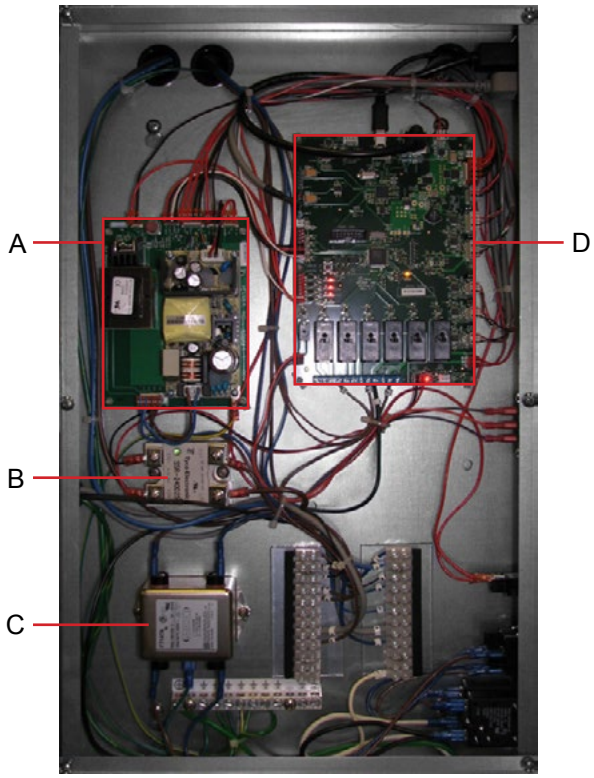


Rear features (iPF120 model shown).

Label	Description	Part Number	Schematic Label
A	Electrical box	Refer to subsequent section(s) for part numbers.	-
B	Drain line fan	120511	Q
C	Drain line heater	120485	T
D	Drain line	-	-
E	Condensate evaporator assembly (includes condensate evaporator, tray, and cover)	400790-2	J
F	Power cable	North American models: 800002-1 European models: 800003-1	A
G	Remote alarm contacts	-	-
H	RJ-45 Ethernet port	800008-1	IF
I	USB port	120633	IE
J	RS-232 serial port (optional)	-	-
K	Battery backup switch	120202	IC
L	Main power switch	120478	C
M	Circuit breaker, 12 A	120220	B

CAUTION Do not remove the cover from the condensate evaporator tray.

10.3.1 Electrical Box



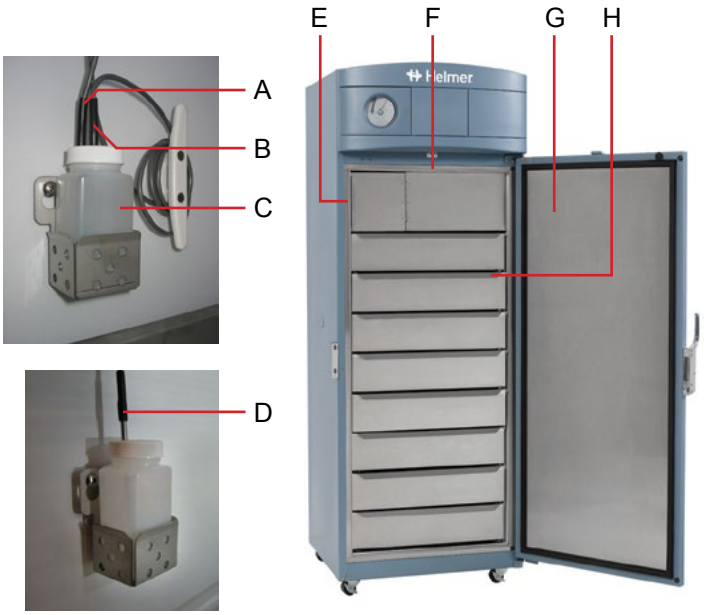
Electrical box features (iPF120 model shown).

CAUTION Disconnect the freezer from AC power before opening the electrical box.

Label	Description	Part Number	Schematic Label
A	Power supply board	800035-1	ID
B	Compressor relay	120426	L
C	Power line filter	120400	D
D	i.C³ control board	800034-1	IA

NOTE The i.C³ control board is sensitive to static electricity and can be damaged by electrostatic discharge. Use proper ESD precautions when handling the board.

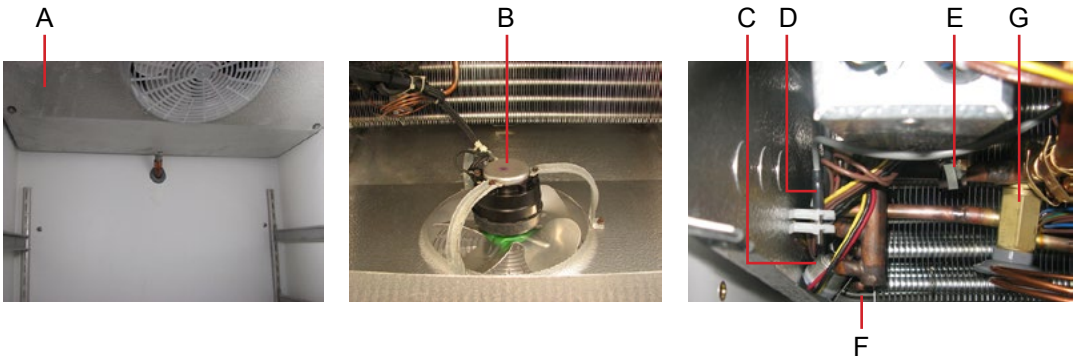
10.4 Interior



Interior features (iPF125 model shown).

Label	Description	Part Number	Schematic Label
A	Chart recorder probe	800024-1	CB
B	Upper monitor probe	800038-1	IK
C	Probe bottle and propylene glycol kit	400922-1	-
D	Lower monitor probe	800037-1	IJ
E	Mullion heater (behind strike plates)	800082-1	U
F	Door switch	120380	M
G	Door	Refer to subsequent section(s) for part numbers	-
H	Storage parts	Refer to subsequent section(s) for part numbers	-
Not shown	Strike plate replacement kit (includes strike plates (2 vertical, 2 horizontal), with pre-applied foam tape, foil tape, and instructions)	400687-1	-
	Unit cooler	Refer to subsequent section(s) for part numbers	F

10.4.1 Unit Cooler



Left: Unit cooler. Center and right: Unit cooler parts.

Label	Description	Part Number	Schematic Label
A	Unit cooler assembly	120476	F
B	Unit cooler fan motor	120548	E
C	Control probe	800048-1	IT
D	Defrost heater limit thermostat	800014-1	S
E	Defrost heater	120567	R
F	TXV (expansion) valve	220495	-
Not shown	Defrost temperature probe	-	IL

10.4.2 Storage

Storage features (left: iLF125 model shown; right: iPF125 model shown).

Label	Description	Part Number
A	Full shelf (includes hardware)	120 model: 400414-1 125 model: 400414-2
B	Drawer assembly (includes drawer, 2 slides, hardware)	120 model: 400584-2 125 model: 400584-1
Not shown	Drawer slide assembly (right side)	120 model: 400541-3 125 model: 400541-1
	Drawer slide assembly (left side)	120 model: 400541-4 125 model: 400541-2
	Roll-out basket assembly (optional, includes basket, 2 slides, hardware)	120 model: 400890-1 125 model: 400890-2
	Roll-out basket slide assembly (right side)	120 model: 400541-3 125 model: 400541-1
	Roll-out basket slide assembly (left side)	120 model: 400541-4 125 model: 400541-2
	Drawer slide wheel	320815-1
	Half shelf (includes hardware)	400413-1

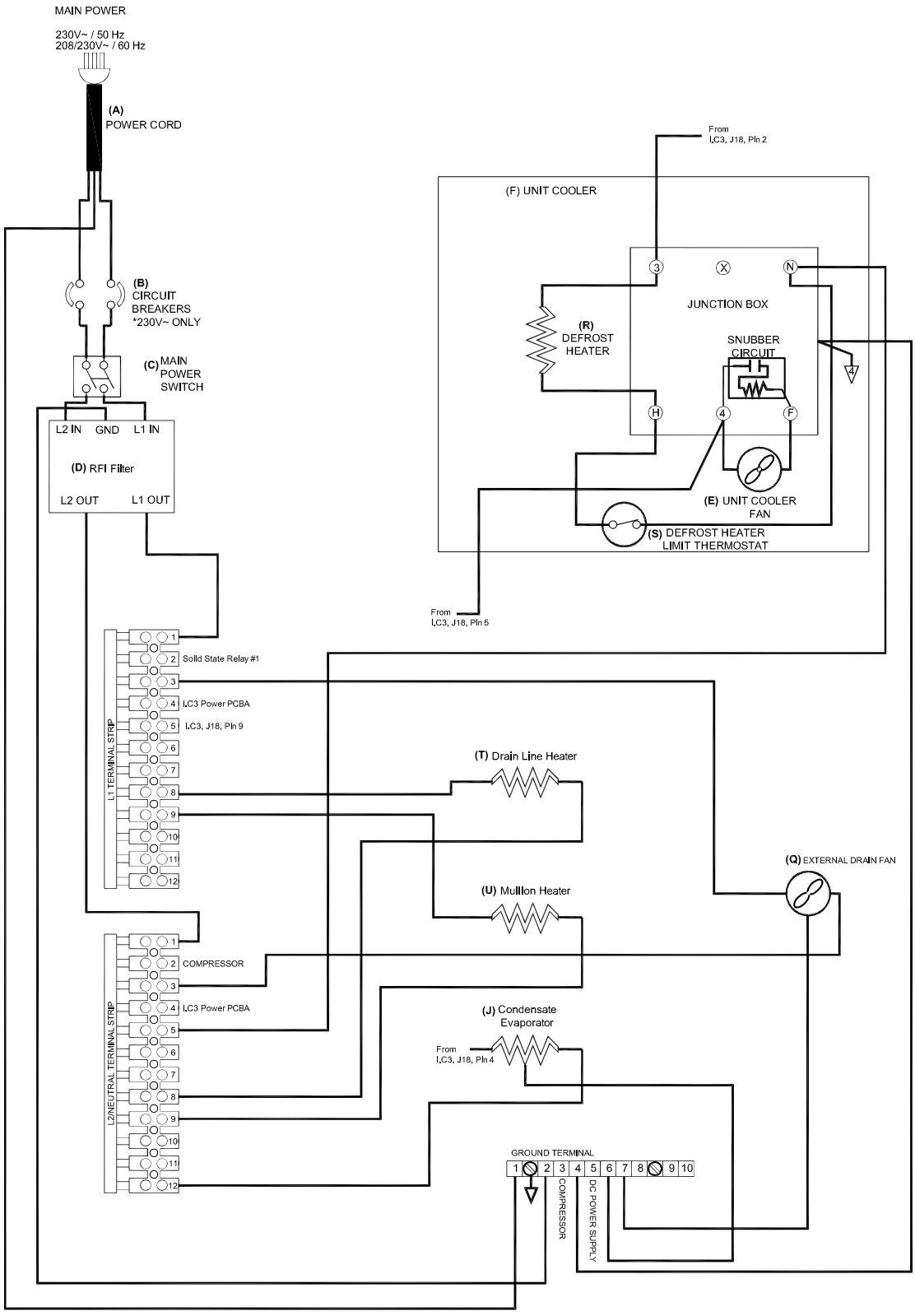
10.4.3 Door and Hinge

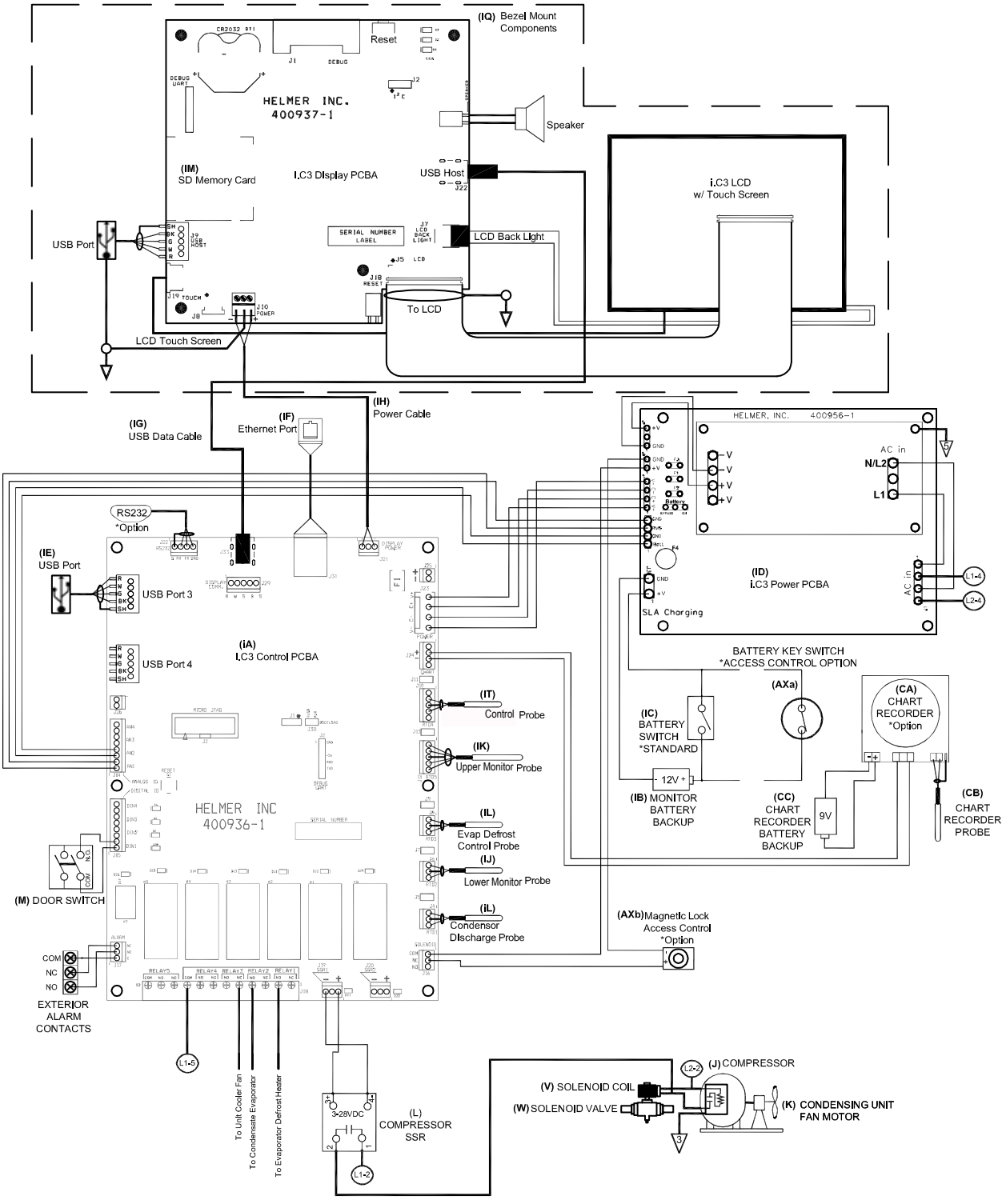
Door and hinge features (iPF125 model shown).

Label	Description	Part Number
A	Door lock	220540
B	Upper hinge assembly (includes pin and bracket)	Left hinge: 400960-2 Right hinge: 400960-1
C	Upper hinge bearing	220541
D	Door gasket	320726-1
E	Door bumper	220441
F	Lower hinge cam (quantity 2)	320742-1
G	Lower hinge bearing	220375
H	Door stop	320763-1
I	Ground strap	120688
J	Lower hinge bracket	Right hinge: 400377-1 Left hinge: 400377-2

11 Schematics

11.1 iPF and iLF Models; 120 and 125 Configurations




(IQ) Bezel Mount Components
Reset
HELMER INC.
400937-1
Speaker
(IM)
SD Memory Card
I.C3 Display PCBA
USB Host
i.C3 LCD
w/ Touch Screen
USB Port
LCD Back Light
To LCD
LCD Touch Screen
(IH)
Power Cable
(IG)
USB Data Cable
(IF)
Ethernet Port
HELMER, INC. 400956-1
AC in
N/L2
L1
RS232
*Option
(IE)
USB Port
USB Port 3
USB Port 4
(iA)
I.C3 Control PCBA
(ID)
i.C3 Power PCBA
SLA Charging
BATTERY KEY SWITCH
*ACCESS CONTROL OPTION
(AXa)
(IC)
BATTERY
SWITCH
*STANDARD
(CA)
CHART
RECORDER
*Option
(IB) MONITOR
BATTERY
BACKUP
(CC)
CHART
RECORDER
BATTERY
BACKUP
9V
(CB)
CHART
RECORDER
PROBE
(IT)
Control Probe
(IK)
Upper Monitor Probe
(IL)
Evap Defrost
Control Probe
(IJ)
Lower Monitor Probe
(iL)
Condensor
Discharge Probe
HELMER INC
400936-1
(M) DOOR SWITCH
(AXb)Magnetic Lock
Access Control
*Option
COM
NC
NO
EXTERIOR
ALARM
CONTACTS
L1-5
To Unit Cooler Fan
To Condensate Evaporator
To Evaporator Defrost Heater
3-28VDC
(L)
COMPRESSOR
SSR
L1-2
(V) SOLENOID COIL
(W) SOLENOID VALVE
L2-2
(J) COMPRESSOR
(K) CONDENSING UNIT
FAN MOTOR

Section III: Horizon Series™ Models

12 Product Configuration

12.1 Install Battery for Backup Power

The monitoring system has a battery system, enabling a period of continuous operation if power is lost.

NOTE

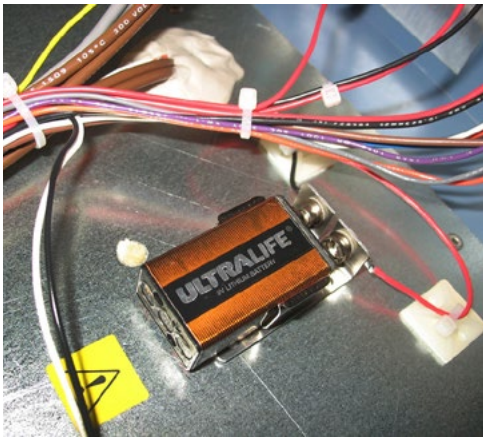
- The optional Access Control system uses an independent battery for backup power, in the event of a power failure.
- The monitoring system will start on battery power alone. If the freezer was previously not connected to AC power and the battery is connected, the monitoring system will begin running on battery power.

Battery life varies by manufacturer as well as voltage level remaining. Providing full power is available, and no battery-related alarms are active, backup power for the monitoring system is available for up to two hours. Providing full power is available, backup power for the optional Access Control system is available for up to 2.5 hours.

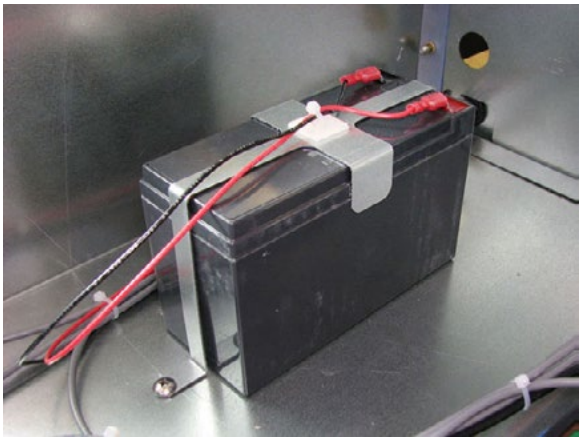
CAUTION

- Before installing or replacing batteries, switch the power OFF. Disconnect the freezer from AC power.
- When installing a replacement battery, use only a battery which meets the manufactuerer's specifications.

The monitoring system and optional Access Control batteries are located on the top of the freezer.



Monitoring system backup battery.



Optional Access Control backup battery.

Monitoring system battery is included in the literature box. Install and connect the battery to provide monitoring system with backup power in the event of AC power failure. Switch the Access Control backup battery ON to provide the optional Access Control system with backup power in the event of an AC power failure.

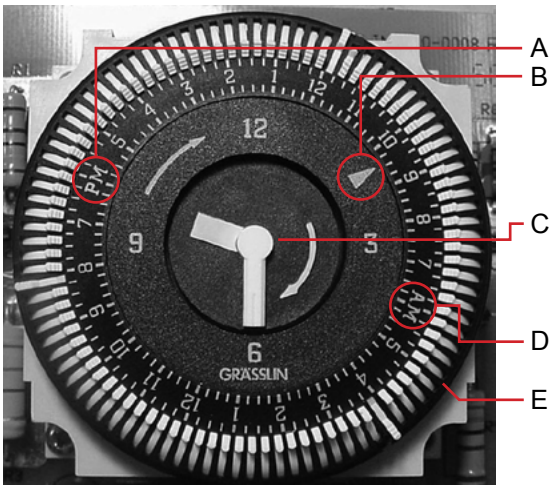
12.2 Schedule Defrost Events

Defrost events may be scheduled to occur at specific times.

Access to the defrost controller is available from the back of the freezer, in the electrical box.

Specify the number of defrost events to execute per day, as well as the time at which to initiate each defrost cycle. The cycles are based on the current time settings on the defrost controller.

The defrost controller features two time indicators and a time adjustment ring. The hour and minute hands show the current time in hours and minutes. The outer ring shows the current time including AM or PM, to the nearest 15-minute interval.



Defrost controller with current time set to approximately 9:30 PM.

Label	Description
A	PM indicator
B	Current time indicator (includes AM/PM, to the nearest 15-minute interval)
C	Current time indicator (hour and minutes only)
D	AM indicator
E	Time adjustment ring

12.2.1 Set Current Time

1. Switch the AC ON/OFF switch OFF. Turn the Alarm Disable key switch OFF.
2. Remove the electrical box cover on the back of the freezer.
3. Rotate the time adjustment ring clockwise until the current time indicators show the current time.
4. Replace the electrical box cover.
5. Switch the AC ON/OFF switch ON. Turn the Alarm Disable key switch ON.
6. Press the **Mute** button to disable the high temperature alarm while freezer reaches operating temperature.

12.2.2 Set Defrost Time

- ► Default setting of three defrost events per day
- ► Default times are 12:00 AM, 8:00 AM, 4:00 PM
- ► Defrost events can be added or removed
- ► Defrost events can be scheduled for any time of day (in 15-minute intervals)
- ► Defrost cycle lasts 15 to 30 minutes
- ► Defrost events must be at least one hour apart

NOTE Three defrost cycles are recommended for consistent freezer operation.

12.2.3 Schedule a Defrost Event

- ► Switch defrost event switch(es) to the ON position (outside) to initiate a defrost event at that time.
- ► Switch defrost event switch(es) to the OFF position (inside) to cancel a defrost event at that time.

1. Switch the AC ON/OFF switch OFF. Turn the Alarm Disable key switch OFF.
2. Remove the electrical box cover on the back of the freezer.
3. Add a defrost event:
   - ► At the appropriate time mark, position the switch ON (toward the outer ring).
4. Remove a defrost event:
   - ► At the appropriate time mark, position the switch OFF (toward the inside ring).
5. Replace the electrical box cover.
6. Switch the AC ON/OFF switch ON. Turn the Alarm Disable key switch ON.
7. Press the **Mute** button to disable the high temperature alarm while freezer reaches operating temperature.

Defrost controller with defrost times set to On position at 12:00 AM, 8:00 AM, and 4:00 PM.

12.3 External Monitoring Devices

The remote alarm interface is a relay switch with three terminals:

- ► Common (COM)
- ► Normally Open (NO)
- ► Normally Closed (NC)

Terminals are dry contacts and do not supply voltage. Interface circuit is either normally open or normally closed, depending on terminals used.

Requirements for your alarm system determine which alarm wires must connect to terminals.

CAUTION

- ► The interface on the remote alarm monitoring system is intended for connection to the end user's central alarm system(s) that uses normally-open or normally-closed dry contacts.
- ► If an external power supply exceeding 30 V (RMS) or 60 V (DC) is connected to the remote alarm monitoring system's circuit, the remote alarm will not function properly; may be damaged; or may result in injury to the user.

The terminals on the remote alarm interface have the following maximum load capacity:

- ► 0.25 A at 30 V (RMS); 0.25 A at 60 V (DC)

12.3.1 Connect to Remote Alarm Interface

1 Switch AC ON/OFF switch OFF. Disconnect the battery.
3 On the electrical box, locate the remote alarm terminals.
4 Connect remote alarm wires to appropriate terminals, according to requirements for your alarm system.
5 Use a cable tie to relieve strain on alarm wires (as necessary).
6 Switch AC ON/OFF switch ON. Reconnect the battery.
7 Press the **Mute** button to disable the high temperature alarm while freezer reaches operating temperature.

12.4 Move Drawers, Shelves, and Baskets

Storage features.

CAUTION
- ► Before moving drawers, ensure they are completely empty for safe lifting.
- ► Maximum basket, drawer, or shelf load is 100 lbs (46 kg).

NOTE Before moving storage components, protect stored items in freezer from extended exposure to adverse temperature.

Remove a drawer or basket

1. Pull drawer or basket out until it stops.
2. Tilt the front of the drawer or basket upward.
3. Pull drawer or basket free of the slides.

Install a drawer or basket

1. Align end guides on drawer or basket with the slides.
2. Gently push drawer or basket into chamber until it stops.
3. Pull drawer or basket out until it stops; check for smooth operation.

Remove a shelf

1. With one hand, lift front edge of the shelf from the front brackets.
2. With the other hand, reach under the shelf and bump rear edge of the shelf upward to disengage rear brackets.

Install a shelf

1. Insert shelf into chamber, placing it on brackets.
2. Gently bump rear edge of the shelf downward to engage brackets.
3. Pulling shelf forward gently; shelf should not disengage from rear brackets.

12.5 Move Slides and Brackets

Remove drawer slides

1. Using a screwdriver, remove front bracket retainers.
2. Tap front brackets upward to disengage standards.
3. Remove slides from standards.

Install drawer slides

1. Insert slides into standard at appropriate height.
2. Tap front brackets downward to engage standards.
3. Using a screwdriver, install front bracket retainers.

Remove shelf brackets

1. Using a screwdriver, remove front bracket retainers.
2. Tap front brackets upward to disengage standards.
3. Remove front brackets from standards.

Install shelf brackets

1. Insert front brackets into standard at appropriate height.
2. Tap front brackets downward to engage standards.
3. Using a screwdriver, install front bracket retainers.

12.6 Level the Freezer

NOTE

- Leveling feet are optional.
- Helmer recommends the use of leveling feet.
- A bubble level may be used to ensure the freezer is level.

Leveling feet must be adjusted to provide unit cooler drainage.

Front-to-back

1. Using a wrench, raise or lower leveling feet.
2. When freezer is properly leveled, bottom of the unit cooler will slope downward from front to back (toward the condensate drain line).

Side-to-side

1. Using a wrench, raise or lower leveling feet.
2. When freezer is properly leveled, bottom of the unit cooler will be horizontal (parallel to the floor).

12.7 Optional Adapter Kits for Medication Dispensing Locks

Contact Helmer Technical Service or your distributor for service documentation pertaining to medication dispensing locks.

13 Settings

Through the Horizon Series monitoring and control system, current settings may be viewed and changed.

NOTE

- Control Sensor Offset and Hysteresis settings are factory-preset and should not be changed unless directed by Helmer Technical Service.
- Changing temperature settings affects operation of the freezer. Do not change settings unless instructed in product documentation or by Helmer Technical Service.

13.1 Monitor and Controller Interface

Label	Description	Function
A	COOL lamp	Indicates the compressor is running.
B	Display	Displays real-time temperature information, setpoints, and alarms.
C	HIGH TEMP lamp	Indicates when the freezer is in a high temperature alarm condition. Also indicates the high alarm temperature setpoint is being changed.
D	LOW TEMP lamp	Indicates when the freezer is in a low temperature alarm condition. Also indicates the low alarm temperature setpoint is being changed.
E	DOOR ALARM lamp	Indicates when the door is open.
F	UP ARROW button	Increases a temperature setting.
G	DOWN ARROW button	Decreases a temperature setting. Also mutes the audible alarm for five minutes.
H	SEL button	Toggles between alarm monitor and control modes.
I	SET lamp	Indicates when temperature setpoint or alarm setpoint is being changed.
J	SET button	Allows settings to be selected, prior to changing settings.
K	CONTROL lamp	Indicates when the reading from the control probe is displayed.
L	MONITOR lamp	Indicates when the display is showing temperature readings from the monitor probe. Also indicates when alarm setpoints are being changed.

13.2 Display Minimum and Maximum Monitor Temperature Recordings

NOTE

- ► This feature is standard on Horizon Series™ models with serial numbers of 2015494 or higher. Some exceptions may exist. For confirmation on your unit, please contact Helmer Technical Service.
- ► Units that do not include the minimum and maximum recording feature will not display .C or .F when entering the program mode.

The minimum and maximum recording feature allows the user to view a minimum temperature occurrence and a maximum temperature occurrence within a given period of time. The timer provides a time reference in which those temperatures occurred.

NOTE The following steps only apply to the monitor probe.

1 View **minimum** temperature recording.
- **a** Press and hold the **Down Arrow** button for 1 second and listen for a single beep.
- **b** The display will alternate between **LO** and a valid temperature value five (5) times followed by a single beep to indicate exit back to the temperature display.

2 View **maximum** temperature recording.
- **a** Press and hold the **Up Arrow** button for 1 second and listen for a single beep.
- **b** The display will alternate between **HI** and a valid temperature value five (5) times followed by a single beep to indicate exit back to the temperature display.

3 View recorded temperature timer.

NOTE

- ► The timer denotes the period of time that has elapsed. It does not display the time at which a minimum or maximum temperature occurred.
- ► The maximum period of time the timer can record is 99:59 (99 hours and 59 minutes).

- **a** Press and hold either the **Up** or **Down Arrow** button for 1 second.
- **b** While the display is flashing the **HI** or **LO** value, press and hold the **SET** button for 1 second.
- **c** The display will alternate five (5) times between **CLr** and a value representing the number of hours and minutes that have elapsed since the last recording (example: 12:47 would represent 12 hours and 47 minutes). A single beep will follow to indicate exit back to temperature display.

4 Clear minimum and maximum temperature recordings.
- **a** Press and hold either the **Up** or **Down Arrow** button for 1 second.
- **b** While the display is flashing the **HI** or **LO** value, press and hold the **SET** button for 1 second and listen for a single beep.
- **c** While the display is flashing the elapsed time since last reset, press and hold the **SET** button for 2 seconds. **CLr** will be displayed followed by a series of 3 beeps to indicate exit back to the temperature display.

NOTE The minimum and maximum temperature and timer will reset when:
- ► the unit is powered off and battery backup is not engaged, or
- ► after 99 hours and 59 minutes have elapsed.

13.3 Freezer Temperature Setpoint

NOTE Default setpoint is -30.0 °C.

Change the setpoint if:

► Your organization requires a chamber temperature other than -30.0 °C.

Change setpoint:

1 On the monitoring system, press and release **SEL** to change to Control mode. The CONTROL lamp will illuminate.
2 Press and hold **SET** to display the reference temperature.

NOTE Reference temperature is typically higher than the chamber temperature.

3 Hold **SET** and press **Up Arrow** and **Down Arrow** as necessary to set the adjustment value determined in step 2.
4 Release all buttons; the setpoint is changed.
5 Press and release **SEL** to return to Monitor mode. The MONITOR lamp will illuminate.

13.4 Table of Parameters

Parameter	Visual Indicator	Range	Default
Celsius or Fahrenheit	None	.C, .F	.C
High Temperature	MONITOR Lamp & HIGH Lamp	-40.0 to 40.0 (°C) -40 to 104 (°F)	-20.0°C
Low Temperature	MONITOR Lamp & LOW Lamp	-40.0 to 40.0 (°C) -40 to 104 (°F)	-40.0°C
Monitor Offset	MONITOR Lamp	-10.0 to 10.0 (°C) -18 to 18 (°F)	Varies
Control Offset	CONTROL Lamp	-10.0 to 10.0 (°C) -18 to 18 (°F)	Varies
Hysteresis	CONTROL Lamp	0.5 to 2.5 (°C) 1 to 5 (°F)	2.0°C

13.4.1 View Alarm Setpoints and Offset Values

1 Press and hold the **Up** and **Down Arrows** simultaneously for 3 seconds to enter program mode.
2 The LED Display will show .C or .F to indicate Celsius or Fahrenheit.
3 Press and release **SEL** to scroll through the parameters and view settings.
4 Hold **Up** and **Down Arrows** simultaneously for 3 seconds to exit program mode.
5 The LED Display will show current monitor temperature.

13.4.2 Temperature Units

NOTE If temperature units are changed, the temperature setpoints, offsets and alarm settings must be recalibrated.

1 Press and hold the **Up** and **Down Arrows** simultaneously for 3 seconds to enter program mode.
2 The LED Display will show .C or .F to indicate Celsius or Fahrenheit.
3 Press and hold the **SET** button while pressing the **Up** or **Down Arrow** to select the desired temperature unit parameter.
4 Release **SET** button. The new setting is saved.
5 Press and hold **Up** and **Down Arrows** simultaneously for 3 seconds to exit program mode.

13.5 Temperature Alarm Setpoints

Temperature alarm setpoints specify the temperature at which an alarm activates.

13.5.1 High Temperature Alarm

1. Press and hold the **Up** and **Down Arrows** simultaneously for 3 seconds to enter program mode.
2. The LED Display will show .C or .F to indicate Celsius or Fahrenheit.
3. Press **SEL** until HIGH TEMP and MONITOR lamps flash.
4. Hold **SET**, then press **Up** or **Down Arrow** to change the setpoint.
5. Release **SET** button. The new setting is saved.
6. Press and hold **Up** and **Down Arrows** simultaneously for 3 seconds to exit program mode.

13.5.2 Low Temperature Alarm Setpoint

1. Press and hold the **Up** and **Down Arrows** simultaneously for 3 seconds to enter program mode.
2. The LED Display will show .C or .F to indicate Celsius or Fahrenheit.
3. Press **SEL** until LOW TEMP and MONITOR lamps flash.
4. Hold **SET**, then press **Up** or **Down Arrow** to change the setpoint.
5. Release **SET** button. The new setting is saved.
6. Press and hold **Up** and **Down Arrows** simultaneously for 3 seconds to exit program mode.

13.6 Temperature Calibration Setpoints

Temperature calibration setpoints indicate an acceptable margin of error between the actual temperature value and the desired temperature value.

13.6.1 Monitor Offset

► Value is factory-set to match a calibrated reference thermometer.

NOTE

► Ensure the product simulation bottle is full of solution.
► Probes in the bottle are connected to the monitoring system and sense chamber temperature. These probes do not affect freezer setpoint.

Obtain:

► Calibrated reference thermometer; independent and traceable per national standards.
► Tape or wire ties to attach thermometer to monitor probe.

Measure the chamber temperature:

1. Remove the monitor probe from the probe bottle and unscrew the cap.
2. Attach the thermometer to the probe, and immerse at least 2” (50 mm) in bottle.
3. Close the door and allow the chamber temperature to stabilize for 10 minutes.
4. Note the temperature on the calibrated reference thermometer and compare to the chamber temperature displayed on the monitor.
5. Adjust the monitor offset value higher or lower to reflect the difference between the chamber temperature displayed on the monitor and the temperature reading from the calibrated reference thermometer.
6. Remove thermometer from the probe.
7. Replace bottle cap, ensuring a tight fit.
8. Place probe in bottle, immersing at least 2” (50 mm).

Enter the new offset value:

1. Press and hold the **Up** and **Down Arrows** simultaneously for 3 seconds to enter program mode.
2. The display will show .C or .F to indicate Celsius or Fahrenheit.
3. Press **SEL** until only the MONITOR lamp flashes.
4. Hold **SET**, then press **Up** or **Down Arrow** to change the monitor offset.
5. Release **SET** button. The new setting is saved.
6. Press and hold **Up** and **Down Arrows** simultaneously for 3 seconds to exit program mode.

13.6.2 Control Sensor Offset

► Factory-preset. Varies for each freezer.

Determine control sensor offset:

NOTE

► Control Sensor Offset is factory-preset and should not be changed. Contact Helmer Technical Service for instructions regarding changing the Control Sensor Offset.
► Steps in Item 13.6.1 must be performed to ensure the monitor display is calibrated and accurate prior to adjusting the Control Sensor Offset.

1. View and record the Freezer Setpoint. (Reference **Section III**, **Item 13.3**)
2. Allow the unit to run with calibrated monitor temperature for several compressor cycles, and record the average monitor temperature .
3. View and record the current Control Offset value.
4. Subtract the Freezer Setpoint from the average monitor temperature and record the difference.
5. Add the current Control Offset value to the recorded difference determined in the previous step to establish the new Control Offset value.

EXAMPLE

1. Freezer Setpoint is -30.0
2. Average monitor temperature is -31.2
3. Current Control Offset is 0.3
4. Subtract: -31.2 - (-30.0) = -1.2; difference between average temperature and setpoint
5. Add 0.3 + (-1.2) = -0.9; new Control Offset value

Enter the new offset value:

1. Press and hold the **Up** and **Down Arrows** simultaneously for 3 seconds to enter program mode.
2. The Display will show .C or .F to indicate Celsius or Fahrenheit.
3. Press **SEL** until only the CONTROL lamp flashes.

NOTE

► Ensure Control Sensor Offset is being changed, and not Hysteresis.
► Control Sensor Offset and Hysteresis have the same visual indicator.

4. Hold **SET**, then press **Up** or **Down Arrow** to change the setpoint.
5. Release **SET** button. The new setting is saved.
6. Press and hold **Up** and **Down Arrows** simultaneously for 3 seconds to exit program mode.

13.6.3 Hysteresis

► Allowable temperature variance on each side of the freezer setpoint.

NOTE Hysteresis is factory-preset and should not be changed. Contact Helmer Technical Service for instructions regarding changing the Hysteresis value.

13.7 Test Alarms

Test alarms to ensure they are working correctly. The freezer has alarms for chamber temperature, power failure, and door open (time).

NOTE
- ► Before testing alarms, protect items in freezer from extended exposure to adverse temperature.
- ► The Alarm Disable key switch disables all audible alarms. This switch does not affect alarm lamps or signals sent through the remote alarm interface.

13.7.1 Chamber Temperature Alarm

Obtain:

► glass with 4 oz. (120 mL) of product simulation solution (1:1 ratio of water to propylene glycol or equivalent low-temperature fluid).

NOTE Temperature probes are fragile; handle with care.

Test the high alarm:

1. Identify setting for high alarm setpoint.
2. Place the glass of product simulation solution in the freezer.
3. When the product simulation solution has stabilized at the chamber temperature, remove the solution from the freezer.
4. Remove the monitor probe from the probe bottle.
5. Place the probe in the product simulation solution, observe the temperature on the monitoring system display at which the high temperature alarm sounds.
6. Compare the temperature at which the alarm sounds to the high alarm setpoint. If values do not match, refer to **Section III, Item 15** (Troubleshooting).
7. Remove probe from product simulation solution.
8. Place monitor probe in probe bottle, immersing it at least 2” (50 mm).

13.7.2 Power Failure Alarm

NOTE During a power failure, the battery should continue to provide power to the monitoring system.

1. Switch AC ON/OFF switch OFF. Audible power failure alarm will activate immediately and “PoFF” (power off) will appear on the display.
2. Switch AC ON/OFF switch ON. Audible power failure alarm will cease and “PoFF” will clear from the display.

13.7.3 Door Open Alarm

► Factory-set to three minutes.

► Value can not be changed.

Test the alarm:

1. Open freezer door and note the time.
2. After three minutes, audible alarm will activate and DOOR ALARM lamp will flash.
3. Close freezer door. Audible door open alarm will cease and DOOR ALARM lamp will stop flashing.

14 Maintenance

NOTE
- ► Refer to the operation manual for the preventive maintenance schedule.
- ► Before performing maintenance, protect items in freezer from extended exposure to adverse temperature.
- ► Allow freezer temperature to stabilize at setpoint after performing service or after extended door opening.

14.1 Recharge Refrigerant

CAUTION
- ► Review all safety instructions prior to recharging refrigerant. Refer to **Section I, Item 2** (Safety).
- ► Maintenance should only be performed by trained refrigeration technicians.

NOTE Use only non-CFC R-404A refrigerant.

Full initial refrigerant charge varies by model and power requirements, which can be found on the product specification label.

Model	Power Requirements	Initial Charge
120 and 125 models	230 V, 60 Hz	29.0 oz. (822 g)

Obtain:
- ► Refrigerant
- ► Calibrated pressure gauge (0 psi to 220 psi (0 kPa to 1520 kPa))

Add refrigerant:
1. Attach pressure gauge to the fittings on the refrigeration lines.
2. Monitor the low side (suction) pressure through a full compressor cycle.
3. Measure the pressure at the end of the next cycle, immediately before the compressor stops.

NOTE Pressure varies depending on ambient air temperature.

4. Add refrigerant. Check the pressure on the high side and the low side.
   - ► Low side = 2 psi to 4 psi (14 kPa to 28 kPa)
   - ► High side = 180 psi to 220 psi (1241 kPa to 1520 kPa)
5. Remove pressure gauge.

14.2 Check Monitoring System Battery

The monitoring system does not indicate the charge level of the battery. Regularly test the battery. Replace battery if the test fails or if the battery has been in use for one year.

Test the battery:

1 Switch the AC ON/OFF switch OFF.
   - **a** Display should continue to display information.
   - **b** If the display is blank, replace battery.

2 Switch AC ON/OFF switch ON.

NOTE Use a battery which meets manufacturer's specifications.

14.3 Check Optional Access Control System Battery

During an AC power failure, the Access Control backup battery provides backup power to power the magnetic Access Control lock. Test the Access Control backup battery to ensure it is working properly.

Check the battery:

1 Ensure Access Control battery key switch is switched ON.
2 Switch AC ON/OFF switch OFF.
3 Verify "PoFF" (power failure) message is displayed.
4 Attempt to open the cabinet door.
   - ► If the door remains locked, the battery is functional.
   - ► If the door does not remain locked, replace the battery.

4 Switch AC ON/OFF switch ON.

14.4 Clean the Freezer

14.4.1 Condenser Grill

CAUTION Disconnect freezer from AC power when cleaning the condenser grill.

In environments where freezer is exposed to excessive lint or dust, condenser grill may require cleaning more frequently than stated in preventive maintenance schedule.

Clean the condenser grill using a soft brush and a vacuum cleaner.

14.4.2 Exterior

Clean exterior surfaces with soft cotton cloth and non-abrasive liquid cleaner.

CAUTION The condensate evaporator and water evaporation trays are hot.

14.4.3 Interior

Clean painted surfaces with mild detergent. Clean stainless steel surfaces with a general-purpose laboratory cleaner suitable for stainless steel.

14.4.4 Door Gaskets

Clean with soft cloth and mild soap and water solution.

14.4.5 Clean and Refill Probe Bottle

Obtain:

- ► Fresh water-bleach solution (not provided)
  - ► 1:9 ratio of bleach to water
  - ► Bleach is 5% solution of commercial sodium hypochlorite (NaOCl)
  - ► Equivalent oxidizing cleaner/disinfectant approved by your organization may be substituted
- ► 4 oz. (120 mL) of product simulation solution per bottle
  - ► Solution is a 1:1 ratio of water to propylene glycol (or equivalent low-temperature fluid)

Clean and refill bottle:

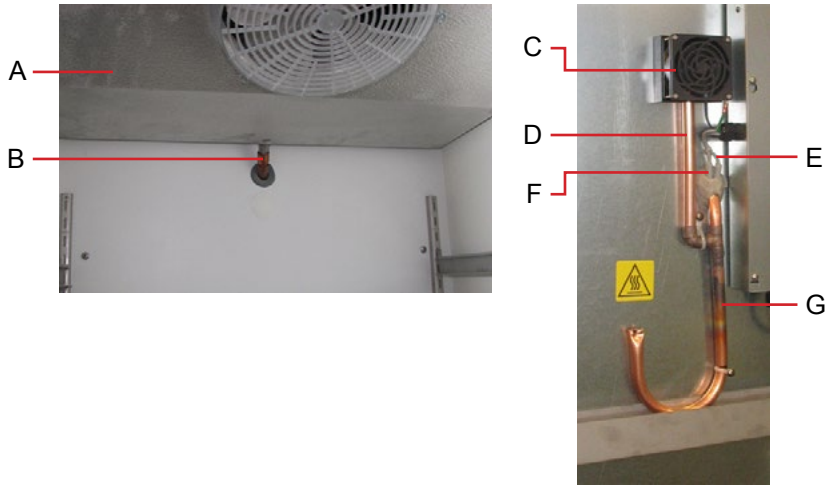
1. Remove probe from bottle.
2. Remove bottle from bracket.
3. Clean bottle with water-bleach solution.
4. Fill bottle with 4 oz. (120 mL) of product simulation solution.
5. Cap bottle tightly to minimize evaporation.
6. Place bottle in bracket.
7. Replace probe, immersing at least 2” (50 mm).

14.5 Unit Cooler Removal and Installation

If unit cooler cover is not removed as detailed in this procedure the drain port may be damaged. Improper drainage may result in excessive icing and freezer’s inability to maintain temperature.

Required tools:

- ► 5/16” socket wrench
- ► Tool to push putty away from the drain tube



Drain tube, fan, and heater components.

Label	Description
A	Unit cooler cover
B	Drain port
C	Drain fan
D	Fan tube
E	Heater wires
F	Heating element
G	Drain tube

14.5.1 Remove the Unit Cooler Cover

1. Switch AC ON/OFF switch OFF. Disconnect the battery.
2. On the back of the cabinet, peel the putty back to expose the drain tube (G) and drain heater (F).

CAUTION The condensate evaporator and water evaporation trays are hot.

3. Verify the heating element is cool. Remove the screws and loosen the pipe straps securing the drain tube to the cabinet.
4. Remove the drain heater from the drain tube.
5. Remove the drain tube (G) by pulling it downward. The drain tube should separate from the fan tube (D) at the 90° elbow, leaving the fan tube (D) attached to the fan (C).
   a. Separate the drain hose inside the cabinet from the unit cooler drain port (B).
   b. Gently twist the drain hose from left to right to separate it from the unit cooler drain port.
   c. Pivot the drain tube and drain hose upward then remove the assembly from the cabinet.
6. Remove top drawer, basket, or shelf from the chamber.

NOTE For HPF models, remove the Cold-Shield panel. Loosen three screws securing the panel to the cabinet then slide the panel to free it from the screws.

7. Remove the unit cooler cover (A).
   a. Hold unit cooler cover in place to prevent it from dropping.
   b. Use the socket wrench to remove four screws securing the unit cooler cover.
   c. Carefully lower unit cooler cover to avoid damage to the fan wiring.

14.5.2 Install the Unit Cooler Cover

1. Verify unit cooler wiring is connected and routed correctly.
   a. Wiring should be routed above copper tube inside the unit cooler.
   b. Reconnect wires if they have separated.
2. Attach unit cooler cover.
   a. Lift unit cooler cover into place.
   b. Front edge of the cover should be behind the unit cooler case.
   c. Use the socket wrench to install four screws to secure the unit cooler cover.
3. Insert the drain tube and drain hose through the hole in the cabinet.
   a. Push drain tube and drain hose upward at an angle, toward the unit cooler drain port.
   b. Pivot the drain tube and drain hose downward then push the assembly upward.
   c. In the chamber, push the drain hose onto the drain hose.
4. Attach the drain tube to the fan tube.
5. Insert the drain line heater in the drain tube.
   a. Insert the heater at an upward angle.
   b. The black heating element should no longer be visible.
6. On the back of the cabinet, press putty around the drain tube and drain line heater.
7. Reinstall top drawer, basket, or shelf if previously removed.

NOTE For HPF models, reinstall the Cold-Shield panel.

8. Reattach the pipe straps to secure the drain tube to the cabinet.
9. Switch AC ON/OFF switch ON. Reconnect the battery.
10. Press the **Mute** button to disable the high temperature alarm while freezer reaches operating temperature.

15 Troubleshooting

CAUTION Review all safety instructions prior to troubleshooting. Refer to **Section I, Item 2** (Safety).

15.1 General Operation Problems

Problem	Possible Cause	Action
A drawer does not slide easily.	Debris in the drawer slides.	► Pull the drawer out and confirm the slides are free of debris. Clean if necessary.
	Drawer slides are not lubricated.	► Using a multi-purpose grease, lubricate the bearings in the slides.
	Ice buildup in the drawer slides.	► Pull the drawer out and confirm the slides are free of ice. De-ice if necessary.
	Drawer is misaligned or not level.	► Confirm both slides for the drawer are mounted at the same height.
	Drawer slide is faulty.	► Confirm the slide is operating correctly. Replace if necessary.
The door does not open easily.	Debris in the hinges.	► Confirm the hinges are free of debris. Clean the hinges if necessary.
	Door hinges are not lubricated.	► Using a general-purpose grease, lubricate the pivots in the hinges.
	Hinge cam is faulty.	► Confirm the hinge cam is not damaged. Replace the cam if necessary.

15.2 Chamber Temperature Problems

Problem	Possible Cause	Action
The chamber temperature displayed is higher or lower than the actual temperature.	Connections for the monitor probe are loose.	► Test the monitor probe connections. Secure the connections if necessary.
	Monitor probe wiring is an open circuit.	► Check the continuity of the probe wiring. Replace the probe if necessary.
	Probe bottle is empty, or the amount of solution is too low.	► Check the level of product simulation solution in the bottle. Clean and refill the bottle if necessary.
	Solution in the probe bottle is frozen.	► Refill the bottle with new solution.
	Digital electronics are locked because of an interruption in power.	► Reset the monitoring system.
	Monitor is not calibrated.	► Confirm the monitor probe is reading correctly. Calibrate the monitor probe if necessary.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.

Problem	Possible Cause	Action
"Prob" appears on the display, but the chamber temperature is set correctly.	Connections for the monitor probe are loose.	► Test the probe connections. Secure the connections if necessary.
	Monitor probe wiring is an open circuit.	► Check the continuity of the probe wiring and connections. Secure the connections or replace the probe if necessary.
	A component is faulty.	► Contact Helmer Technical Service.
An error code displays on the monitor.	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
The chamber temperature meets an alarm condition, but the appropriate temperature alarm is not active.	Temperature alarm setpoint was changed.	► Check the current setpoints for the temperature alarms. Change the setpoints if necessary.
The compressor runs continuously.	Freezer setpoint is set too low.	► Confirm the setpoint is set within the operating range and change it if necessary.
	Control probe in the unit cooler is faulty.	► Confirm the control probe is providing resistance in the range of 98 Ω to 110 Ω. Replace the probe if necessary.
	Temperature monitor/ control board is faulty.	► Confirm the temperature controller or monitor/ control board is operating correctly. Replace it if necessary.
	Compressor starting relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.

Problem	Possible Cause	Action
The chamber temperature does not stabilize at the freezer setpoint.	Monitor/control board is faulty.	► Confirm the temperature controller or monitor/control board is operating correctly. Replace it if necessary.
	Compressor starting relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.
	Temperature monitor/controller board is faulty.	► Confirm the temperature monitor/controller board is operating correctly. Replace the board if necessary.
	Condensing unit fan is not running.	► Check the condensing unit fan connections. Replace the fan motor if necessary.
	Unit cooler fan is not running.	► Check the voltage to the fan when door switch is activated. Replace the fan motor or door switch if necessary.
	Compressor motor has seized.	► Replace the compressor.
	Control probe is out of calibration.	► Confirm the probe is providing accurate temperature readings.
	Control probe is faulty.	► Confirm the probe is providing resistance in the range of 98 Ω to 110 Ω. Replace the probe if necessary.
	Refrigerant level is too low.	► Check the refrigeration lines for leaks and repair them if necessary. Check the refrigerant level. Recharge the refrigerant if necessary.
	Probe bottle is empty.	► Refill the probe bottle.
	The condenser grill is dirty.	► Check the condenser grill. Clean the grill if necessary.
	Air circulation at the top of the chamber is not adequate.	► Check if there are any items that may obstruct air flow and remove them if necessary.
	Ambient air temperature around the freezer is too high.	► Confirm the freezer is placed appropriately.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.

15.3 Alarm Activation Problems

Problem	Possible Cause	Action
The freezer is in an alarm condition, but the appropriate alarm is not audible or active.	Alarm system is faulty.	► Confirm the circuit board and line connections are functioning correctly.
	Monitor/control board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	Alarm buzzer is faulty.	► Replace the alarm buzzer or speaker.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	Alarm Disable key is in the OFF position.	► Turn the Alarm Disable key to the ON position.
	Alarm setpoint was changed.	► Check the current setpoints for the alarms.
The High Temperature alarm activates when the door is opened, then clears shortly after the door is closed.	Connections for the monitor probe are loose.	► Test the monitor probe connections. Secure the connections if necessary.
	Monitor probe is faulty.	► Test the probe. Replace the probe if necessary.
	Unit cooler fan continues to run while the door is open.	► Test the door switch and unit cooler fan connections. Secure the connections if necessary. Replace the door switch or fan motor if necessary.
	Probe bottle is empty.	► Check the level of product simulation solution in the bottle. Clean and refill bottle if necessary.
	High temperature alarm setpoint is set too low.	► Check the setpoint. Change the setpoint if necessary.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
The freezer is connected to power, but the AC Power Failure alarm is active.	Outlet connection is faulty.	► Verify power at the outlet. Repair the original outlet or connect to a different outlet if necessary.
	Power cord is faulty.	► Confirm the power cord is connected securely. Secure the power cord if necessary.
	ON/OFF AC power switch located inside the front lower panel is faulty.	► Replace the ON/OFF AC power switch.
	ON/OFF AC power switch is OFF.	► Turn the ON/OFF AC power switch to the ON position.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	Circuit breaker was tripped.	► Confirm the circuit breaker switch is seated. Push the circuit breaker switch to reset the circuit breaker.

Problem	Possible Cause	Action
The Door Open alarm is activating sporadically.	Door is not closing completely.	► Confirm the hinge cams are not damaged. Replace the cams if necessary.
	Door is closing but not sealing completely.	► Confirm the door gasket seals completely. Replace the door gasket if necessary.
	Connections for the door switch are faulty.	► Test the switch connections. Secure the connections if necessary.
	Door switch is faulty.	► Replace the door switch.
	Monitor/control board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
All alarms are activating sporadically.	Alarm system is faulty.	► Confirm the circuit board and line connections are functioning correctly.
	Monitor/control board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	Compressor is overheating due to lack of airflow.	► Check the condenser grill. Clean if necessary. ► Confirm freezer location meets requirements.
	Refrigerant level is too low.	► Check refrigeration lines for leaks and repair if necessary. Check the refrigerant level. Recharge refrigerant if necessary.
An alarm activated, but the temperature recorded at activation does not match the alarm setpoint.	Temperature changed slightly around the time of activation.	► No action necessary.
The High Temperature alarm is activating sporadically.	Monitor probe is not immersed in the product simulation solution.	► Confirm the probe bottle is full of solution, and the probe is placed in the bottle correctly.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	Monitor probe is not calibrated.	► Confirm the monitor probe is reading correctly. Calibrate the probe if necessary.

15.4 Condensation and Icing Problems

Problem	Possible Cause	Action
There is excessive water in the water evaporation tray inside the lower compartment in the back of the unit.	Humid air is entering the chamber	► Confirm the freezer is level, and the door is aligned, closing tightly, and sealing correctly. Correct issues as necessary.
	Heater in the water evaporation tray is faulty.	► Confirm the heater is hot and is drawing the correct current (approximately 0.21 A to 0.35 A). Replace the heater if necessary.
There is excessive ice in the chamber.	Humid air is entering the chamber.	► Confirm the freezer is level, and the door is aligned, closing tightly, and sealing correctly. Correct issues as necessary.
	Unit cooler drain line is damaged or restricted.	► Confirm the unit cooler drain line is free of debris and is not restricted. Remove debris if necessary.
	Drain line is plugged.	► Confirm the drain tube is free of debris. Remove debris if necessary.
	External drain fan is faulty.	► Confirm the external drain fan is running. Hold a piece of paper in front of the fan and confirm that the paper is being drawn toward the freezer. ► Confirm the connections are secure. Tighten connections if necessary. ► Replace the drain line fan if necessary.
	Connection between the unit cooler and the drain line is loose.	► Confirm the connection is secure. Tighten the connection if necessary.
There is excessive moisture on the door.	Humid air is entering the chamber.	► Confirm the freezer is level, and the door is aligned, closing tightly, and sealing correctly.
	Relative humidity around freezer is too high.	► Confirm freezer location meets requirements.
After a defrost cycle, no water flows into the water evaporation tray.	Not enough time has elapsed since the end of the defrost cycle.	► Allow approximately 20 minutes after the end of the defrost cycle to check for water in the evaporation tray.
	Drain line is plugged.	► Confirm the drain tube is free of debris. Remove debris if necessary.
	Drain line heater is faulty.	► Confirm the drain line heater is warm to the touch. Contact Helmer Technical Service to resolve issues as necessary.
	Defrost heater on the evaporator in the unit cooler is not working.	► Check for ice buildup on the evaporator by looking through the fan grill with a flashlight. If there is significant ice buildup inside or behind the unit cooler, initiate a defrost cycle of the freezer.
	Defrost heater on the evaporator in the unit cooler is faulty.	► Confirm the drain line heater is hot and is drawing the appropriate current during a defrost event (approximately 3.3 A to 5.5 A). ► Replace the defrost heater if necessary.

16 Parts

NOTE

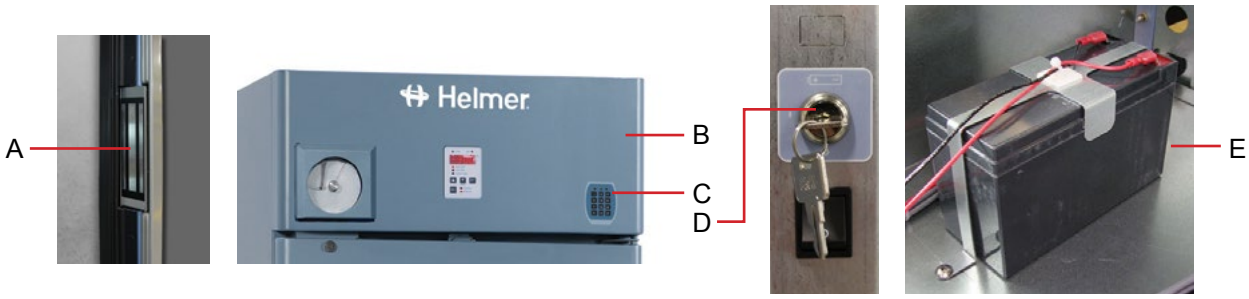
- ► Before replacing parts, protect items in freezer from extended exposure to adverse temperature.
- ► Allow freezer temperature to stabilize at setpoint after replacing parts or after extended door opening.

16.1 Front

Front features (HLF125 model shown).

Label	Description	Part Number	Schematic Label
A	Temperature chart recorder (standard on plasma freezer models, optional on laboratory models)	800083-1	CA
B	Horizon Series monitoring and control system	Refer to subsequent section(s) for part numbers	HA
C	Bezel (with chart recorder door)	800093-1	-
	Bezel (without chart recorder door)	800092-1	-
Not shown	Chart paper (52 sheets)	220419	-
	Chart recorder backup battery	120218	CC
D	Alarm disable key switch	120227	HE
E	Caster (swivel with brake)	220467	-

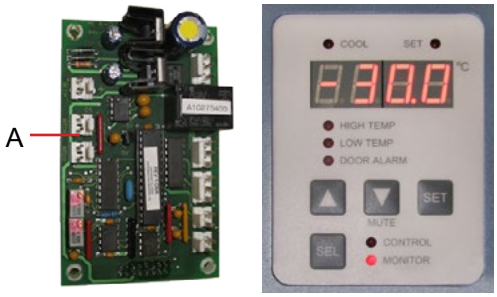
16.1.1 Access Control Option



Access Control features (HPF125 model shown).

Label	Description	Part Number	Schematic Label
A	Magnetic lock	800138-1	AXb
B	Bezel	With chart recorder: 800095-1 Without chart recorder: 800094-1	-
C	Keypad	800007-1	HM
D	Backup battery key switch	401220-1	AXa
E	Backup battery	120628	AXe

16.1.2 Control System Display Parts

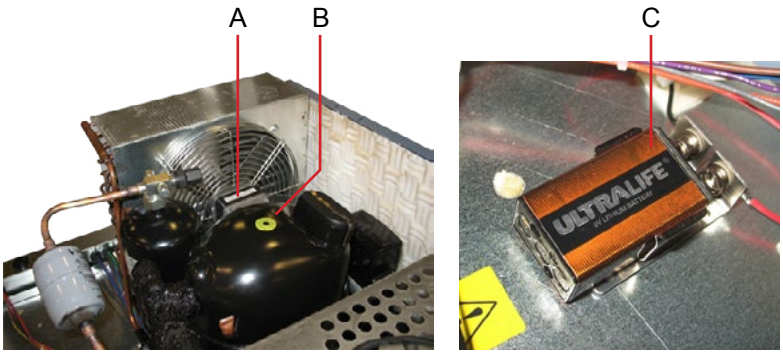


Left: Control board. Right: Display with touchpad.

Label	Description	Part Number	Schematic Label
A	Control board assembly	800006-1	HA

NOTE The display board is sensitive to static electricity and can be damaged by electrostatic discharge. Use proper ESD precautions when handling the board.

16.2 Top



Top features.

Label	Description	Part Number	Schematic Label
A	Condenser fan motor	230 V, 50 Hz: 120515 230 V, 60 Hz: 120493	K
B	Compressor	230 V, 50 Hz: 400672-3 230 V, 60 Hz: 400672-4	J
C	Monitoring system backup battery	120399	HH
Not shown	Solenoid valve	220547	W
	Solenoid coil	800096-1	V

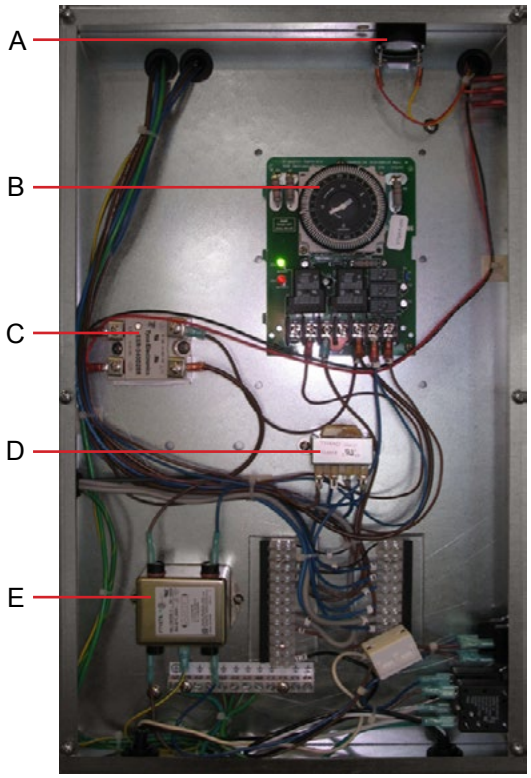
16.3 Rear

Rear features (HPF125 model shown).

Label	Description	Part Number	Schematic Label
A	Electrical box	Refer to subsequent section(s) for part numbers.	-
B	Drain line fan	120511	Q
C	Drain line heater	120485	T
D	Drain line	-	-
E	Condensate evaporator assembly (includes condensate evaporator, tray, and cover)	400790-2	J
F	Power cable	North American models: 800002-1 European models: 800003-1	A
G	Remote alarm contacts	-	-
H	Main power switch	120478	C
I	Circuit breaker, 12 A	120220	B

CAUTION Do not remove the cover from the condensate evaporator tray.

16.3.1 Electrical Box



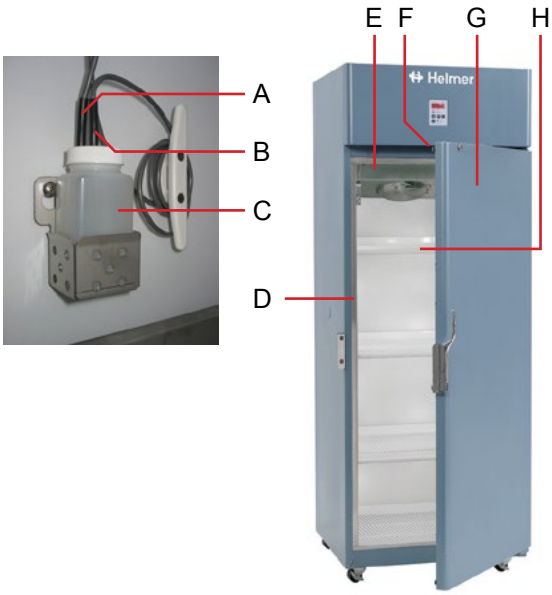
Electrical box features (HPF120 model shown).

CAUTION Disconnect the freezer from AC power before opening the electrical box.

Label	Description	Part Number	Schematic Label
A	Alarm buzzer	120227	HD
B	Defrost timer	800015-2	HF
C	Compressor relay	120426	L
D	Temperature control transformer	800086-1	HO
E	Power line filter	120400	D
Not shown	Access Control power supply (optional)	800035-1	AXd

NOTE The control board is sensitive to static electricity and can be damaged by electrostatic discharge. Use proper ESD precautions when handling the board.

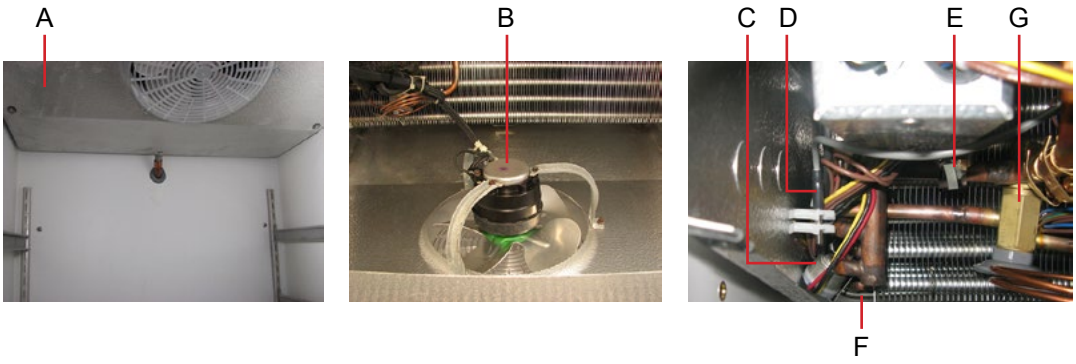
16.4 Interior



Interior parts (iLF125 model shown).

Label	Description	Part Number	Schematic Label
A	Chart recorder probe	800024-1	CB
B	Monitor probe	800029-1	HC
C	Probe bottle and propylene glycol kit	400922-1	-
D	Mullion heater (behind strike plates)	800082-1	U
E	Unit cooler	Refer to subsequent section(s) for part numbers	F
F	Door switch	120380	M
G	Door	Refer to subsequent section(s) for part numbers	-
H	Storage parts	Refer to subsequent section(s) for part numbers	-
Not shown	Strike plate replacement kit (includes strike plates (2 vertical, 2 horizontal), with pre-applied foam tape, foil tape, and instructions)	400687-1	-
	Unit cooler	-	F

16.4.1 Unit Cooler



Left: Unit cooler. Center and right: Unit cooler parts.

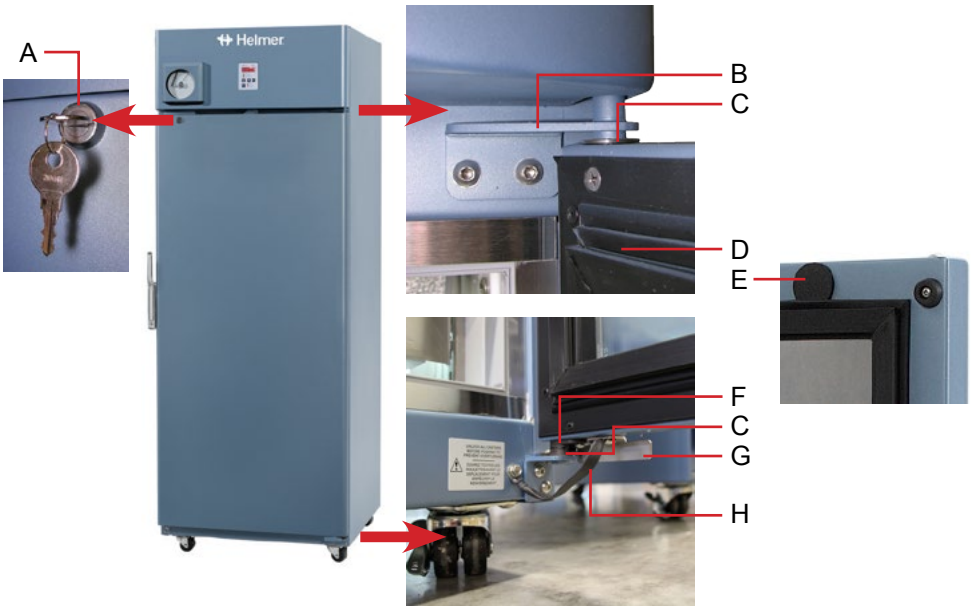
Label	Description	Part Number	Schematic Label
A	Unit cooler assembly	120476	F
B	Unit cooler fan motor	120548	E
C	Fan delay/defrost termination thermostat	800085-1	HJ
D	Control probe	800028-1	HB
E	Defrost heater limit thermostat	800014-1	S
F	Defrost heater	120567	R
G	TXV (expansion) valve	220495	-

16.4.2 Storage

Storage parts (left: HLF125 model, right: HPF125 model).

Label	Description	Part Number
A	Full shelf (includes hardware)	120 model: 400414-1 125 model: 400414-2
B	Drawer assembly (includes drawer, 2 slides, hardware)	120 model: 400584-2 125 model: 400584-1
Not shown	Drawer slide assembly (right side)	120 model: 400541-3 125 model: 400541-1
	Drawer slide assembly (left side)	120 model: 400541-4 125 model: 400541-2
	Roll-out basket assembly (optional, includes basket, 2 slides, hardware)	120 model: 400890-1 125 model: 400890-2
	Roll-out basket slide assembly (right side)	120 model: 400541-3 125 model: 400541-1
	Roll-out basket slide assembly (left side)	120 model: 400541-4 125 model: 400541-2
	Drawer slide wheel	320815-1
	Half shelf (includes hardware)	400413-1

16.4.3 Door and Hinge

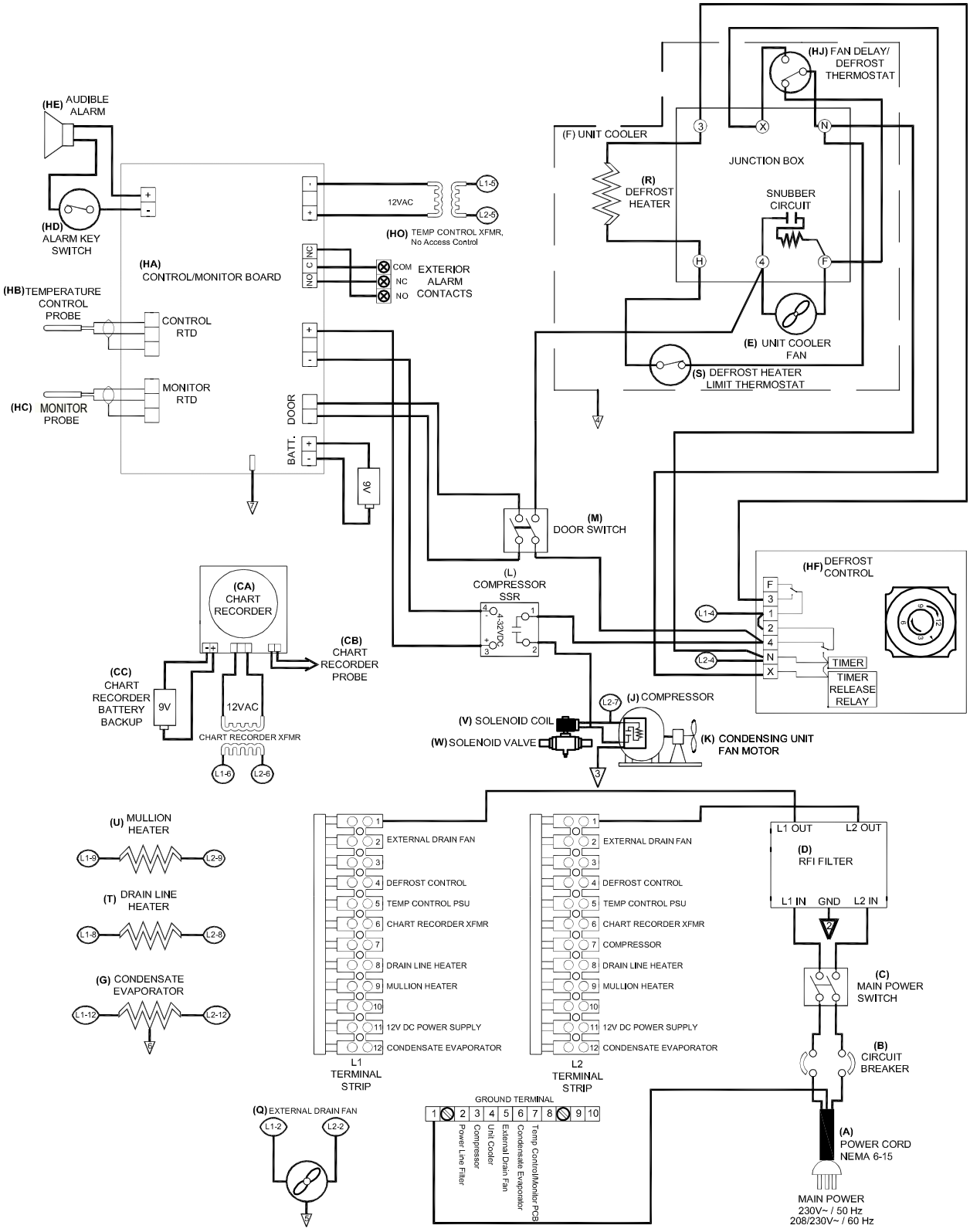


Door and hinge features (HPF120 model shown).

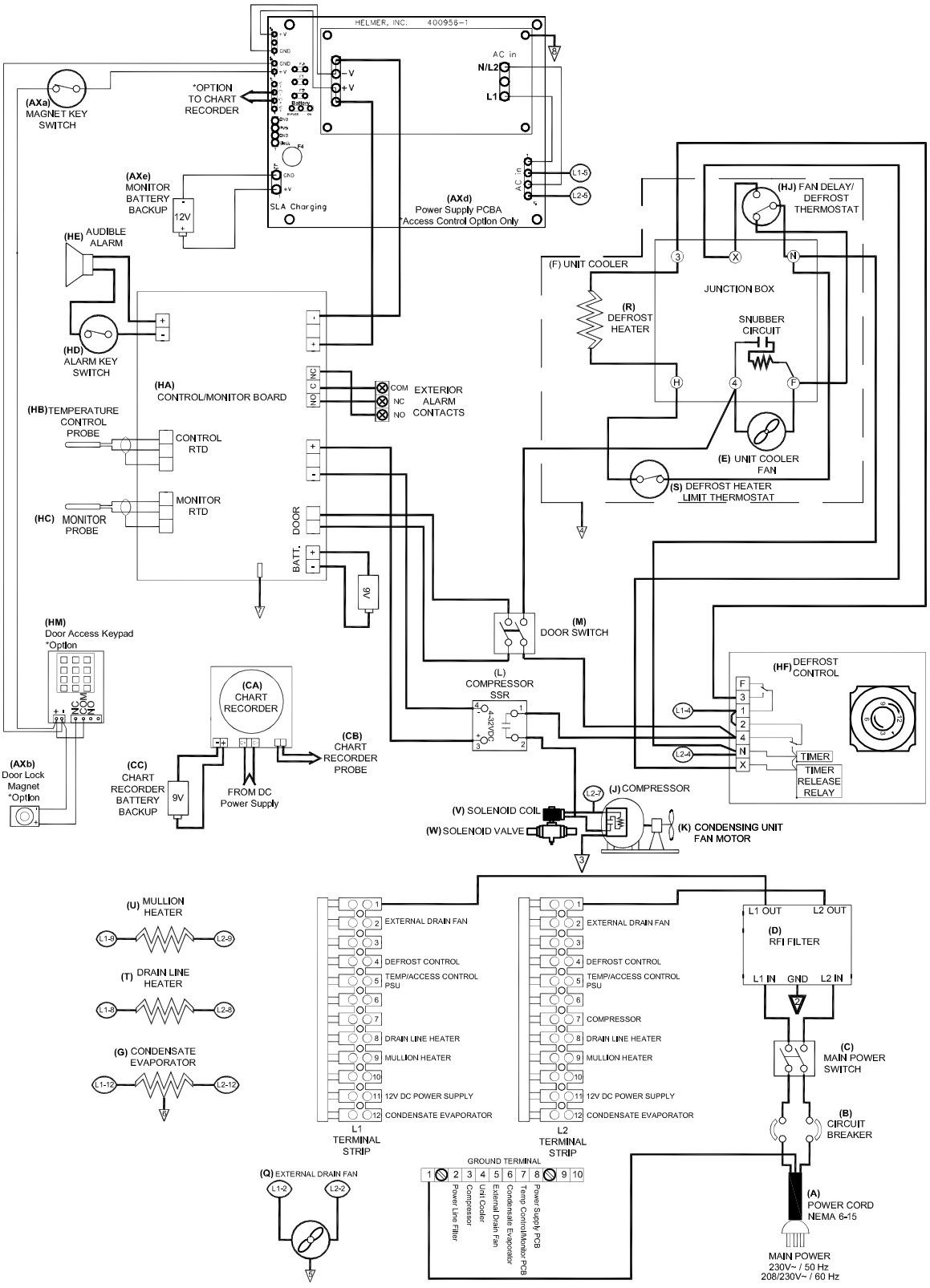
Label	Description	Part Number
A	Door lock (functions as Access Control manual override lock on models equipped with Access Control option)	220540
B	Upper hinge bracket	Left hinge: 400376-2 Right hinge: 400376-1
C	Hinge bearings	220375
D	Door gasket	320726-1
E	Door bumper	220441
F	Lower hinge cam (quantity 2)	320742-1
G	Door stop	320763-1
H	Lower hinge bracket	Right hinge: 400377-1 Left hinge: 400377-2
I	Ground strap	120688

17 Schematics

17.1 HPF and HLF Models; 120 and 125 Configurations without Access Control



17.2 HPF and HLF Models; 120 and 125 Configurations with Access Control



END OF MANUAL

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